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HAWAIIAN GAMES

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INTRODUCTION

The new materials of this paper were collected from four Hawaiian sailors, from Honolulu, named Aka (Kamehameha), Daviese Kahimoku, Welakahao, and Hale Paka (Harry Park), and verified by means of Andrews' *Hawaiian Dictionary*.[1] These have been supplemented by information from other sources[2] and by a few notes on similar games in other islands,[3] the object

[1] Honolulu, 1865.

[2] Peter Corney, *Voyages in the Northern Pacific* (1813–1818), Honolulu, 1896. William Ellis, *Polynesian Researches*, London, 1853. Charles Wilkes, U. S. N., *Narrative of the U. S. Exploring Expedition during the Years 1833–1842*, Philadelphia, 1845. H. Carrington Bolton, *Some Hawaiian Pastimes* (*Journal of American Folk-lore*, vol. IV, No. 21). W. D. Alexander, *A Brief History of the Hawaiian People*, N. Y., 1871. Wm. T. Brigham, *Preliminary Catalogue of the Bernice Pauahi Bishop Museum*, Honolulu, 1892.

[3] Rev. John B. Stair, *Old Samoa, or Floatsam and Jetsam from the Pacific Ocean*, London, 1897. Thomas Williams and James Calvert, *Fiji and the Fijians*, N. Y., 1859. R. Taylor, *Te ika a maui, or New Zealand and its Inhabitants*, London, 1855. Ernest Dieffenbach, *Travels in New Zealand*, London, 1843. R. H. Codrington, *The Melanesians, Studies in their Anthropology and Folk-lore*, Oxford, 1891. In addition the writer desires to acknowledge his indebtedness to that most suggestive paper by Dr E. B. Tylor: "*Remarks on the Geographical Distribution of Games*," in the *Journal of the Anthropological Institute*, vol. IX, 1879, and to the chapters on "Toys and Games" in Prof. A. C. Haddon's valuable work, *The Study of Man*, 1898.

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being to furnish a concise account of the games of Hawaii for comparative purposes.

Many of the ancient games and amusements of the Hawaiians have practically disappeared since the discovery of the islands by Captain Cook in 1778, but the people retain their pleasure-loving characteristics and assemble on their numerous holidays[1] to engage in wrestling, cock-fighting, and other sports. Live pigs, bread-fruit, bananas, and cocoanuts are wagered on these occasions. Alexander[2] states that the Hawaiians resorted to games chiefly for the purpose of betting, to which they were excessively addicted. Men and women of all ranks were eager to stake every article they possessed on their favorite players, and the games seldom ended without fierce brawls between the different parties. This custom of betting to the utmost extent in all games came in, according to Brigham,[3] in the half century preceding the reign of Kamehameha I, coincident with a general decline in the strict observance of religious rites. It was not common to all the islands. Ellis[4] says that the natives of Tahiti do not appear to have been gamblers, nor to have accompanied any of their sports with betting, but seem to have followed their games simply for amusement.

The writer has included in this survey all amusements except the dance. He will be greatly obliged for additions and corrections.[5]

[1] The principal holidays at present, according to my informants, are: March 17, birthday of Kamehameha II; June 11, birthday of Kamehameha I; November 16, birthday of Kalakaua; and New Year's day.

[2] Op. cit., p. 88.

[3] *Preliminary Catalogue*, part II, p. 54.

[4] Op. cit., p. 204.

[5] I have refrained from expressing any conclusions based on the material here presented. In general the games described may be referred to the continent of Asia or to recent European or American influence. There are several, however, which are more directly analogous to games played by the American Indians. The resemblance of *mai-ka* to the game of *chunkee* has already been pointed out (Andrew MacFarland Davis, *Indian Games*, Bulletin of the Essex Institute, Salem, 1885, vol. XVII, p. 126). To this must be added the stone-dice game, or *lu-lu*, which resembles the game played with bone disks by the Micmac and Cheyenne Indians (see *Chess and Playing Cards*,

THE NEW YEAR FESTIVAL

The *Ma-ka-hi-ki*, or New Year festival, in the latter part of the month of *We-le-hu*,[1] was devoted to sports and general gambling. On the 23d day of the moon of *We-le-hu*, the image of Lo-no ma-ku-a,[2] the *Ma-ka-hi-ki* god, was decorated. This idol, according to Alexander,[3] was like a round pole, 12 feet long, and 3 or 4 inches in diameter, with a head carved at one end. A cross-stick, about 6 feet long, was fastened to its neck, at right angles to the pole, to which were attached feather wreaths, and an imitation of a sea-bird, the *ka-u-pu*,[4] was perched upon it. A long white *kapa*, like a sail, was fastened at the top to the cross-piece, and left loose at the bottom. There was also made a short idol, called *A-ku-a pa-a-ni* (god of sport) and *Ma-ka-wa-hi-ne*, because it was set up at boxing matches and other games. The next night fires were lighted on the shore, all around the island, and the people went to bathe in the sea, warming themselves at the fires.

Report U. S. Nat. Museum, 1896, figs. 14, 25); also the games of *pa-hu* and *mo-a*, which are not unlike games played by the Sioux and other plains tribes. The most striking analogy, however, exists between the guessing game of *pu-he-ne-he-ne* and certain Indian games in which a stone or other object is hidden in one of four places. The resemblance here extends even to the use of the stick to strike the supposed place of concealment. A systematic comparison of *pu-he-ne-he-ne* with the American games will be given in the writer's paper on *Indian Guessing Games* now in course of preparation.

[1] The ancient Hawaiians divided the year into twelve months of 30 days each. As this gave but 360 days to their year, they added and gave to their god Lono in feasting and festivity the number of days required to complete the sidereal year, which was regulated by the rising of the Pleiades.

[2] Lo-no was the fourth of the four great gods that were worshiped throughout Polynesia. He had a separate order of priests and temples of a lower grade. Traditions connected with the ancient kings Lonokawai and Lono-i-ka-makahiki, seem to have been mixed with those belonging to the primeval god Lo-no. Lono-i-ka-makahiki is reputed to have instituted the games which were celebrated during the *Ma-ka-hi-ki* festival. He is said on some account to have become offended with his wife and murdered her; but afterward lamented the act so much as to induce a state of mental derangement. In this state he traveled through all the islands, boxing and wrestling with everyone he met. He subsequently set sail, in a singularly shaped canoe, for Tahiti, or a foreign country. After his departure he was deified by his countrymen, and annual contests of boxing and wrestling were instituted in his honor.

[3] Op. cit., p. 59.

[4] A large black bird, the size of a turkey, found mostly in Nihoa and Kaula.

This was a rite of purification, after which they all put on new *ma-lo* and *pa-u*.

The next morning the festival began, and for four days no work was permitted. Land and sky and sea were tabu to *Lo-no*, and only feasting and games were allowed. The high-priest was blindfolded and remained in seclusion for five days. Meanwhile all the *ko-no-hi-ki* (headmen) on the island had been getting ready the taxes of their respective lands, in anticipation of a visit from the long god who was now making a tour of the islands. The long god was preceded by a man carrying two long rods which he set up in the ground on arriving at the boundary of a land. The land was then under tabu or interdict, and no one could leave it until the tax was fully paid. The taxes were brought to the *a-hu*, and when the tax collector was satisfied, the priest chanted a prayer to Lo-no, the crowd joining in the responses, closing with the shout *Au-le e Lo-no!*—when the land became *no-a* or free, and the long idol moved to the next land.

As evening came on, the people assembled from the surrounding country to see the boxing-matches, etc., under the immediate patronage of the short god. For the next two days there were carried on all kinds of sports, such as boxing, wrestling, sliding down hill, throwing the *mai-ka*, foot-racing, etc., attended with general gambling and revelry.

On the fifth day, called *Lo-no*, the bandage was taken from the eyes of the high-priests, and canoes were allowed to go fishing for that day. The tabu was then resumed until the long idol returned, i. e., for about twenty days. On the evening of that day the *Ka-lii* ceremony was performed, as follows:

The king with a numerous company went fishing, taking the long idol with him. On his return, he was accompanied by a warrior, expert in the spear exercise. As the king leaped ashore a man rushed forward with two spears bound with white kapa, and hurled one at him, which was parried, after which he simply touched the king with the other spear, and the

ceremony was over.[1] This was followed by sham fights, until the king put a stop to them and repaired to the *he-i-au* (temple) to pay his devotions to Lo-no.

The next day the long idol was stripped of its ornaments, which were packed up and deposited in the temple for use another year, and a white canoe, called Lo-no's canoe, to return to *Ka-hi-ki* in, was sent to sea, after which all restrictions on fishing and farming were removed (*no-a ka ma-ka-hi-ki*).

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1. *Ko-wa-li:* JUMPING-ROPE.—The rope may be swung by two persons, by one person with the other end fastened, or by one person who also jumps. Two girls frequently jump together, counting until they miss. Andrews gives *pu-he-o-he-o* as "a sport of children like jumping the rope." *Ko-wa-li*, the term given by my informants, is the name of the convolvulus, the vine of which is used as a rope.

Taylor[2] describes the skipping rope of New Zealand under the name *he piu*. Two persons generally hold the rope, and a third skips over it; sometimes they tie an end of the rope to a post and one twirls the rope while several jump over at the same time. It is also used by one person as with us.

2. *Le-le-ko-a-li:* SWINGING.—A single rope is used, to which a stick is attached, across which one person sits, while another sits facing him astride his legs. The swingers are pulled by ropes from the opposite side. The name is from *le-le*, "to fly," and *ko-a-li*, the convolvulus, the vine formerly used for swings.

Ellis[3] says of the Tahitians that they were very fond of the *tahoro*, or swing, and frequently suspended a rope from a branch of a lofty tree, and spent hours in swinging backward and forward. They used the rope singly, and at the lower end fastened a short stick.

[1] Alexander states that Kamehameha always caught the spear himself.

[2] Op. cit., p. 173.

[3] Op. cit., I, p. 228.

Williams[1] describes the Fijian swing as supplying a favorite amusement to children and young people. It consists of a single cord, either a rope or strong vine, suspended from a tree and having at its lower end a loop in which to insert one foot as in a stirrup, or a knot on which both feet rest. Grasping at a convenient height the cord, which varies in length from 30 to 50 feet, the swinger is set in motion and rejoices to dart through the air, describing an arc that would terrify a European.

Tregear[2] describes a New Zealand swing, *morere* or *moari*, consisting of a pole with ropes at the top held by runners, the "giant's stride," sometimes played on the edge of cliffs, half the swing being over the abyss.

Taylor,[3] under *he morere, he moari*, says: "This is a lofty pole, generally erected near a river, from the top of which about a dozen ropes are attached; the parties who use it take hold of them, and swing round, going over the precipice, and, whilst doing so, sometimes let go, falling into the water. Occasionally serious accidents have thus occurred by striking the bank."

3. *Ma-hi-ki:* SEE-SAW.—This is commonly played by girls, who sit astride a board. Two or three sit on each side with two boys standing back to back in the middle.

Wilkes[4] says:

> "They had likewise the amusement of see-saw, which has not yet gone out of fashion, and is performed in a manner somewhat different from ours. A forked post is placed in the ground; on this a long pole is placed, which admits several on each side. After two or three ups and downs, they try which shall give the opposite party a tumble. This is, at times, adroitly done, and down they all fall, to the infinite amusement both of their adversaries and the bystanders, who indulge in loud laughter and merriment at the expense of those who are so unlucky as to get hurt."

4. *Ho-lo-li-o:* "HORSE-RIDING."—Boys play "horse," riding astride a stick.

[1] Op. cit., p. 127.
[2] Page 115.
[3] Page 173.
[4] Vol. IV, p. 47.

5. *Ku-al-a-poo:* "HEAD-STANDING."—Turning somersaults is a common pastime of boys.

6. *Pe-le-pe-le:* BOXING.—Boxing gloves are now used, but formerly the hands were wrapped with kapa, tied at the wrist. Captain King,[1] in his journal of Cook's voyage, describes boxing among the Hawaiians as follows:

"We found a vast concourse of people assembled on a level spot of ground at a little distance from our tents. A long space was left vacant in the midst of them, at the upper end of which sat the judges, under three standards, from which hung slips of cloth of various colors, the skins of two wild geese, a few small birds, and bunches of feathers. When the sports were ready to begin, the signal was given by the judges and immediately two combatants appeared. They came forward slowly, lifting their feet very high behind, and drawing their hands along the soles. As they approached, they frequently eyed each other from head to foot in a contemptuous manner, casting several arch looks at the spectators, straining their muscles, and using a variety of affected gestures. Being advanced within reach of each other, they stood with both arms held out straight before their faces, at which part all their blows were aimed. They struck, in what appeared to our eyes an awkward manner, with a full swing of the arm; made no attempt to parry, but eluded their adversary's attack by an inclination of the body, or by retreating. The battle was quickly decided, for if either of them was knocked down, or even fell by accident, he was considered vanquished."

Ellis says that in Tahiti, "on all great festivals, wrestling was succeeded by the *moto-raa* or boxing. It was mostly practiced by the lower orders and servants of the Areois, and was with them, as boxing is everywhere, savage work. The challenge was given in the same way as in wrestling. The blows were generally straight-forward, severe, and heavy; usually aimed at the head. They fought with the naked fist, and the whole skin of the forehead has been at times torn or driven off at a blow."

Captain Cook[2] states that the method of boxing in the Marque-

[1] *A Voyage to the Pacific Ocean*, 2d ed., London, 1784, vol. III, p. 22.

[2] Vol. III, p. 244.

sas differed very little from that practiced in England, but speaks of seeing boxing matches between women in the presence of at least three thousand people.

7. *Ka-ka-pa-hi:* FENCING.—Fencing is practiced on holidays with wooden swords. The name is derived from *ka-ka*, "to strike," and *pa-hi*, "knife," "sword."

8. *Ku-la-ku-lai:* WRESTLING.—The contestants wear only breechcloths. They each put one arm around the other's neck and the other around his waist. People bet on the contest. Andrews gives *ka-hu-a mo-ko-mo-ko* as "a place where people assemble to wrestle."

In Tahiti, according to Ellis,[1] wrestling, *maona*, was the favorite sport at the *taupiti*, or public assemblies, festivals usually connected with some religious ceremony or cause of national rejoicing. The wrestlers of one district sometimes challenged those of another, but the conquest often took place between the inhabitants of different islands. In this, as in most of their public proceedings, the gods presided. Before wrestling commenced, each party repaired to the *marae* of the idols of which they were the devotees. Here they presented a young plantain tree, which was frequently a substitute for a more valuable offering, and having invoked aid of the tutelar deity of the game, they repaired to the spot where the multitude had assembled. A space covered with grassy turf, or the level sand of the sea-beach, was usually selected for these exhibitions. Here a ring was formed, perhaps thirty feet in diameter. The inner rank sat down, the others stood behind them; each party had their instruments of music with them, but all remained quiet until the games began. Six or ten, perhaps, from each side, entered the ring at once, wearing nothing but the *maro*, or girdle, and having their limbs sometimes anointed with oil. Challenges were sent previous to the arrival of celebrated wrestlers, but if no such arrangement had been made, the wrestlers of one party or perhaps their champion walked

[1] Vol. I, p. 204.

around and across the ring, having the left arm bent, with the hand on the breast, and gave the challenge by striking the right hand violently against the left, and the left against the side, which produced a loud, hollow sound. Several were sometimes engaged at once, but more frequently only two. They grasped each other by the shoulders. Unbroken silence and deep attention were manifested during the struggle; but as soon as one was thrown, the drums of the victor's friends struck up, the women rose and danced in triumph over the fallen wrestler and sang in defiance to the opposite party. The latter immediately commenced a most deafening noise, principally to mar and neutralize the triumph of the victors. When the wrestlers engaged again, the clamor ceased. The victor either withdrew, which was considered honorable, or remained and awaited a fresh challenge. When the contest was over, the men repaired again to the temple and presented their offering of acknowledgment, usually young plantain trees, to the idols of the game.

Captain Cook[1] speaks of wrestling being performed in the Marquesas in the same manner as at Tahiti.

Taylor[2] says that in New Zealand *te takaro ringaringa*, or wrestling, was a very general amusement of young men, who prided themselves on their skill in throwing one another, as much, perhaps, as our own countrymen have ever done. Tregear[3] speaks of it as played with any hold.

J. Stanley Gardiner[4] says that in Rotuma "in wrestling any fall to the ground counted. The chosen champions watched each other carefully from a distance, and then, perhaps, one would rush on the other and make a feint, only to turn aside when they seemed bound to come to close quarters. The great idea was to get one's opponent, from the nature of his or your rush, into an awkward position, so that he could be seized around one thigh, and could not avoid a fall."

[1] Vol. III, p. 244.
[2] Page 173.
[3] Page 115.
[4] *Journal Anthropological Institute*, vol. XXVII, p. 486.

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9. *U-ma:* WRIST- OR ARM-WRESTLING.—The two contestants grasp hands, their elbows resting upon the ground, and each endeavors to press the other's arm over. This is known in Japan as *hizi-zumo*, "elbow-wrestling," or *ude-zumo*, "arm-wrestling." Prof. Edward S. Morse informs me that wrist-wrestling is practiced also by Spaniards and Cubans, each contestant putting his elbow on a piece of money from which he may not remove it.

10. *U-lu-mi i-lo-ko o-ke kai:* "WRESTLING IN THE SEA."—One man tries to "duck" another and reach shore before the ducked one can catch him. The winner receives the stake of roast pig, cocoanuts, or whatever it may be.

11. *Hu-ki-hu-ki-kau-la:* "ROPE-PULLING," TUG-OF-WAR.—The teams consist of seven men on each side, each with a captain. A piece of kapa is tied to the middle of the rope and it is required to pull it a certain distance to one side or the other in order to win. It is played for money prizes.

Stair[1] says that in Samoa "pulling, or trial of strength, was similar to the English tug-of-war, in which each side endeavored to get possession of a pole held between them."

12. *Hu-ki-hu-ki-a-i:* "NECK-PULLING."—Each of two persons puts a loop around his neck and pulls, endeavoring to pull the other over. The contest is engaged in for small prizes. It is known in Japan by the name *kubi hiki.*

13. *Hu-ki-hu-ki-li-ma:* "FINGER-PULLING."—Two persons lock forefingers and each endeavors to pull the other's finger straight out.

14. *Hei-hei-ku-ki-ni:* "FOOT-RACING."—A dozen or more men will race for a prize, a favorite holiday amusement, the stake being a pig, cocoanuts, or bread-fruit. The course is usually one-half to three-quarters of a mile. The starting point is called *pa-hu-ku*, and the goal *pa-hu-ho-pu.* The runners, *ku-ki-ni*, are entirely naked except for a breechclout. *Ku-ki-ni* means "runner." The *ku-ki-ni* was formerly a government officer, whose duty it was to

[1] Op. cit., p. 136.

carry orders to different parts of the island, and such were held in estimation according to their fleetness.[1] In his journal of Cook's voyage to the Pacific ocean,[2] Captain King, speaking of the Hawaiians, says: "They frequently amuse themselves with racing matches between the boys and girls; and here again they wager with great spirit."

Ellis[3] describes the foot-race of Tahiti under the name of *faatitiaihe-mo raa:*

"Young men of the opposite parties engaged. Great preparations were made for this trial of strength and agility. The bodies of the runners were anointed with oil; the *maro*, or girdle, their only garment, was bound tight round the loins. A wreath of flowers adorned the brows, and a light white or colored bandage of native cloth was sometimes bound like a turban round the head. A smooth line of sandy beach was usually selected for the course. Sometimes they returned to the place from which they started, but in general they ran the prescribed distance in a straight line."

15. *Hei-hei-haa-we:* "BURDEN-RACING."—This is a contest in which each of the participants carries another astride his neck.

16. *Hei-hei-e-ke:* "SACK-RACING."—Eight men usually race, starting from a line, running to a goal and back to the line.

17. *Le-le-wa-wae-ka-hi:* "ONE-FOOT JUMPING," HOPPING.—Contestants tie one leg and run races, hopping on one foot.

18. *Le-le-le-la-au:* "STICK-JUMPING," VAULTING.—Vaulting is practiced with the aid of a long pole.

19. *Hei-hei-hu-i-la-ba-la-la:* "WHEELBARROW RACING."—This is a sport of recent introduction.

20. *Hei-hei-au:* "SWIMMING RACE."—Men and boys play, either in fun or for a prize of food or money.

21. *Hei-hei-waa:* "CANOE-RACING."—Two or more canoes race, usually out to sea, the course being a mile or a mile and a half out and around a flag buoy and return. The canoes are propelled with kapa sails.

[1] Andrews, *Hawaiian Dictionary.*

[2] Vol. III, p. 145.

[3] Vol. I, p. 210

Ellis[1] speaks of Tahiti canoe-racing, *faatitiaihe-mo raa vaa*, as "occasionally practiced on the smooth waters of the ocean, within the reefs." J. Stanley Gardiner[2] relates that in Rotuma—

"canoe-sailing was carried on, especially on the occasions of certain big feasts in connection with the *sou*. The canoes employed were the small ones, the *tavane*, with mat sails. In each canoe only one man sailed, and the different districts would contest the prize with ten, twenty, or even more representatives. There were also commonly canoe-races for the women. The course was always inside the reef, and much fun was caused by the constant capsizing of the canoes."

22. *Hei-hei-ka-pu:* "TUB-RACING."—Tubs for racing are made out of casks cut in halves, and propelled with the hands. Andrews gives *ka-pu-wai*, from *ka-pu*, "place," and *wai*, "water," a bathing tub.

23. *Hei-hei-na-lu:* "SURF-RACING."—The surf-board, *pa-pa-hee-na-lu*, is made from the wood of the *wi-li-wi-li* (*Erythrina corallodendrum*) or bread-fruit tree. Ellis[3] describes it as generally five or six feet long, and rather more than a foot wide, sometimes flat, but more frequently slightly convex on both sides. It is usually made of the wood of the *Erythrina*, stained quite black and preserved with great care. After using, it is placed in the sun until perfectly dry, when it is rubbed over with cocoanut oil, frequently wrapped in cloth, and suspended in some part of the dwelling. Dr Bolton[4] describes the play as follows:

"Plunging through the nearer surf, the natives reached the outer line of breakers, and watching their opportunity they lay flat upon the board (the more expert kneeled), and just as a high billow was about to break over them, pushed landward in front of the combers. The waves rushing in were apparently always on the point of submerging the rider, but, unless some mishap occurred, they drove him forward with rapidity on to the beach or into shallow water."

[1] Vol. I, p. 210.

[2] *Journal Anthropological Institute*, vol. XXVII, p. 486.

[3] Vol. IV, p. 369.

[4] *Journal of American Folk-lore*, vol. IV, p. 21.

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Racing in the surf is called *hei-hei-na-lu*, from *hei-hei*, "to race," and *na-lu*, "surf." Two champions will swim out to sea on boards and the one first arriving on shore wins.

Playing in the surf is *hee-na-lu*, from *hee*, "to glide." Andrews gives the names *o-lo* and *o-wi-li* for "a very thick surf-board made

FIG. 4—Surf-board of hard, blackened wood; length, 71 inches. British Museum. (From *Ethnographic Album of the Pacific Islands*, II, 33, No. 1.)

of *wi-li-wi-li*," and *o-ni-ni* as "a kind of surf-board"; also *pa-ha* as "a name for surf-board," and *ki-o-e*, the "name of a small surf-board."

According to Brigham[1]—

"Surf-boards were usually made of *ko-a*, flat with slightly convex surface, rounded at one end, slightly narrowing towards the stern, where it was cut square. Sometimes the *pa-pa* were made of very light *wi-li-wi-li* and then were narrow, *o-lo*. In size they varied from 3 to 18 feet in length and from 8 to 10 inches in breadth, but some of the ancient boards are said to have been 4 fathoms long. The largest in this museum are so heavy that they require two men to move them. The surf riders swam out to sea to the *ku-la-na* or place where the high rollers follow each other in quick succession, and there mounted a high wave and rode on it until near the beach where the water was smoother; the first one arriving at the *hu-a* won the race. The riders sometimes raced also to the *ku-la-na* or starting place. Standing on the boards as they shot in was by no means uncommon. Men and women both took part in this delightful pastime which is now almost a lost art."

Wilkes[2] says: "The Kingsmill islanders use a small board in swimming in the surf like that used by the Sandwich islanders." According to Codrington,[3] "in the Banks' islands and Torres islands, and no doubt in other groups, they use the surf board, *tapa*."

[1] *Preliminary Catalogue*, part II, p. 55.

[2] Op. cit., vol. V, p. 100.

[3] Op. cit., p. 341.

24. *Le-le-ka-wa:* "PRECIPICE-JUMPING."—Leaping from lofty cliffs into the sea is a favorite pastime. The feat is performed as a game, the first one reaching the goal being regarded as the winner. The name is from *ka-wa*, "a precipice," and *le-le*, "to jump."

25. *O-i-li-pu-le-lo.*—A former sport of the chiefs was to send lighted firebrands down a *pa-li*, or precipice, at night. It is thus described by an eye-witness [1]:

"On dark, moonless nights from certain points of these precipices,—where a stone would drop sheer into the sea,—the operator takes his stand with a supply of *pa-pa-la* sticks (a light and porous indigenous wood), and, igniting one, launches it into space. The buoyancy of the wood and the action of the wind sweeping up the face of the cliffs, cause the burning branch to float in mid-air, rising or falling according to the force of the wind, sometimes darting far seaward, and again drifting towards the land. Firebrand follows firebrand, until, to the spectators who enjoy the scene in canoes upon the ocean hundreds of feet below, the heavens appear ablaze with great shooting stars, rising and falling, crossing and recrossing each other in a weird manner. So the display continues until the firebrands are consumed, or a lull in the wind permits them to descend slowly and gracefully into the sea."

The *papala* tree (*Charpentiera ovata*) attains the height of about twenty feet and grows only upon the highlands from two to three thousand feet above the sea.

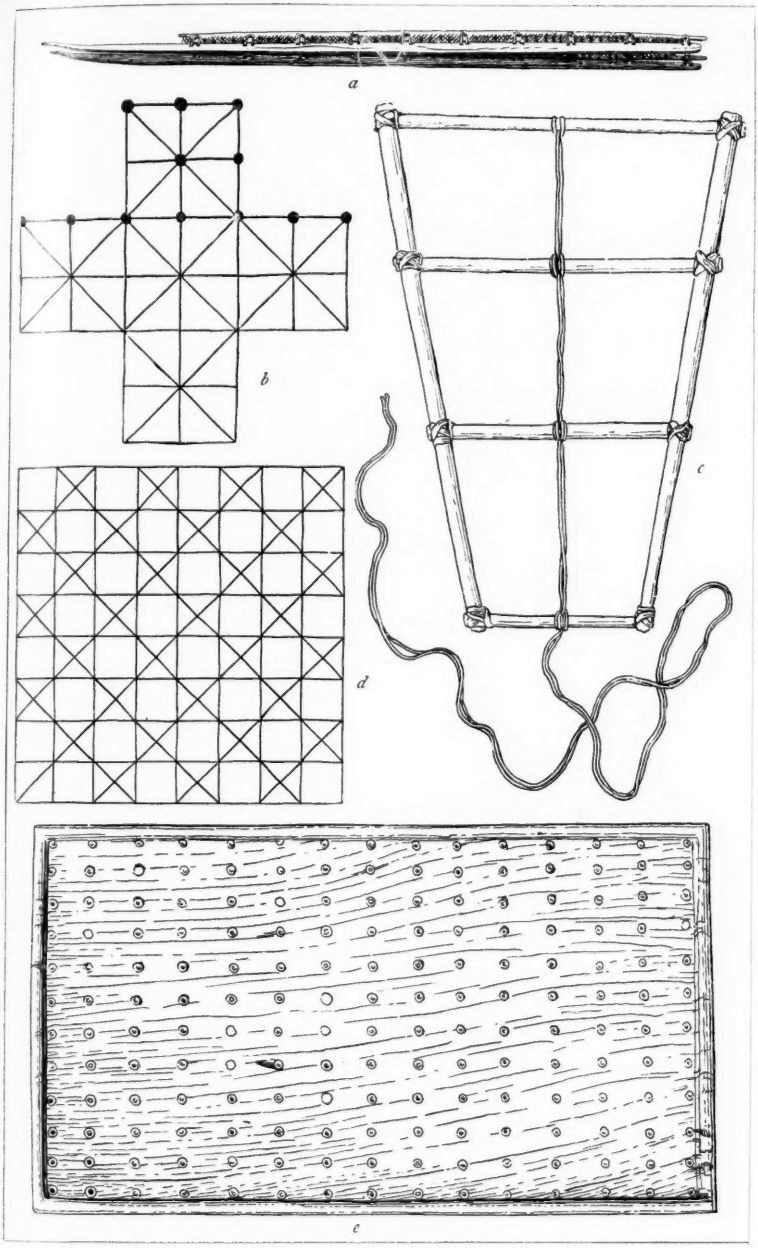
26. *Hee-ho-lu-a:* "SLEDGE-SLIDING."—Two persons, stretched at full length, slide together head-first down hill on a smooth board (*ho-lu-a*). Several often compete, the one down first winning a prize. My informants state that the game is no longer practiced.

Of this pastime Ellis [2] says:

"The *ho-lu-a* has for many generations been a popular amusement throughout the Sandwich Islands, and is still practiced in several places. The *pa-pa* or sledge is composed of two narrow runners, from

[1] Mrs Francis Sinclair, Jr, *Indigenous Flowers of the Hawaiian Islands*, London, 1885. Quoted from Dr Bolton.

[2] Vol. IV, p. 299.



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a, *Pu-pa ho-lu-a*—Sledge for hill-sliding (No. 320, Bishop Museum); *b*, Board for *ma-nu*; *c*, *Pu-waa-pa*—Canoe puzzle (No. 21,445, Museum of Archeology, University of Pennsylvania); *d*, Board for *moo*, draughts; *e*, Board for *ko-na-ne* (No. 867, Bishop Museum).

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7 to 12 or 18 feet long, two or three inches deep, highly polished, and at the foremost end tapering off from the under side to a point at the upper edge. There two runners are fastened together by a number of short pieces of wood laid horizontally across. To the upper edge of these short pieces two long, tough sticks are fastened, extending the whole length of the cross-pieces and about 5 or 6 inches apart. Sometimes a narrow piece of matting is fastened over the whole upper surface, except three or four feet at the foremost end, though in general only a small part for the breast to rest on is covered. At the foremost end there is a space of about two inches between the runners, but they widen gradually towards the hinder part, where they are distant from each other 4 or 5 inches. The person about to slide grasps the small side-stick firmly with his right hand, somewhere about the middle, runs a few yards to the brow of the hill, or starting place, where he grasps it with his left hand, and at the same time, with all his strength throwing himself forward, falls flat upon it, and slides down the hill, his hands retaining their hold of the side-sticks, and his feet being fixed against the hindermost cross-piece of the sledge. Much practice and address are necessary, to assume and keep an even balance on so narrow a vehicle, yet a man accustomed to the sport will throw himself with velocity and apparent ease a hundred and fifty or two hundred yards down the side of a gradually sloping hill."

Brigham [1] states that [1]—

"the *ho-lu-a*, or track, was built with great care on a hill-side, and the remains of one are plainly seen on the hill, *mau-ka*, of the Museum. Constructed of stone when a hollow in the track needed filling, the *ho-lu-a* was covered with earth well beaten down, and dry grass was spread over all, and a very slippery surface resulted. The sled, *pa-pa ho-lu-a*, was made of *ma-ma-me* (*Erythrina crysophylla*) or of *u-hi-u-hi* (*Cæsalpinia kauaiensis*). Two long runners resembling skate irons were bound firmly to the upper stage 2½ inches apart from the centers, the whole sled being some 11¼ feet long. This *pa-pa* was carefully oiled with *ku-kui* oil, and the rider ran with the sled to gather impulse, and then threw himself headlong down the course. This was an eminently aristocratic game."

Two sledges are preserved in the Bishop Museum; one of which (plate XI, *a*) is said to have belonged to the hero Lonoika-makahiki. The other (Cat. No. 321) consists of the runners only.

[1] *Preliminary Catalogue*, part II, p. 56.

XUM

It is related that the goddess Pele enjoyed this game and frequently engaged in it. Ellis[1] relates the story of the contest of the goddess with Kahavari, chief of Puna, in which she drove him from the island by a stream of lava.

27. *Ku-ku-lu-a-e-o:* STILTS.—Walking or racing on stilts is a common amusement of men, boys, and girls. Andrews mentions *o-he* as timber suitable for making stilts, and gives *ha-ka-ke*, "to stand on stilts."

In the Marquesas islands stilts were used, the foot-rests of which were highly carved. These rests were lashed to poles six feet in length which also were carved. Examples of the rests in the Museum of the University of Pennsylvania (Cat. No. 18,016) are carved, as is usual, with human figures. Brigham[2] reports specimens in many European collections, and in the Musée de Marine in the Louvre, a pair attached to poles for use. Another pair of carved bamboo stilts in the Christy collection, designated as "dancing stilts," are figured by Ratzel.[3]

Ellis[4] says that in Tahiti walking on stilts was a favorite amusement with the youth of both sexes. The stilts were formed by nature and generally consisted of the straight branches of a tree, with a smaller branch projecting on one side. The bare feet were placed on this short branch, and thus, elevated about three feet from the ground, they pursued their pastime. Stilt-walking in New Zealand is mentioned by Taylor[5] under the name of *pouturu*, and Tregear[6] adds *araporaka*.

28. *Pai-pai-li-ma:* HAND-CLAPPING.—Two persons stand opposite each other and clap their hands in the same manner as played by children in the United States. The movements are as follows: (1) both clap hands, (2) clap left hands, (3) clap hands, (4) clap right hands, (5) clap hands, (6) clap each other's hands, and then repeat. This is described as a girls' game. They sing, keeping time to the play.

[1] Vol. IV, p. 300.
[2] *Director's Report, Bishop Museum*, Honolulu, 1898.
[3] *History of Mankind*, vol. I, p. 193, London, 1896.
[4] Vol. I, p. 228.
[5] Op. cit., p. 174.
[6] Op. cit., p. 116.

29. *Ku-hi-ku-hi-ma-ka:* "EYE-POINTING."—Two or more persons play. One leads by pointing repeatedly with his finger to his nose, crying "Nose! Nose! Nose!" All the others must then point in the same manner, each with his finger to his eye. The leader changes to his eye, whereupon each of the others must point to his ear. He points to his ear, and they point to the mouth; to the mouth, and they point to the top of the head; to the top of the head, and they clap their hands; the leader then claps his hands and the others point to the breast; finally he points to his breast and they all run and the game comes to a close.

30. *Ku-hi-la-au:* "WOOD-POINTING."—This game is like the preceding. The leader points to the top of a stick or a piece of wood, crying *Ma-lu-na! Ma-lu-na!* ("Above! Above!"); the others must then point to the middle. He then points to the middle, crying *I-wae-na! I-wae-na!* ("Between! Between!"), and the others must point to the bottom. He points to the bottom, crying *Ma-la-lo! Ma-la-lo!* ("Below! Below!"), whereupon the others must point to the side. The leader points to the side, crying *Ao-ao! Ao-ao!* ("Side! Side!"), when the others point to the top again.

31. *O-lo-lo:* "RUBBING."—The feat of rubbing one thigh with the right hand and patting the other with the left hand.

32. *Hu-i-la-ma-ka-ni.*—The feat of describing opposing circles with the hands and arms.

33. *O-le-ha.*—An amusement consisting in placing a stick, about two inches long, between the eyelids to prop them open. The name means, primarily, to set or fix the eyes.

Ellis[1] says that in Tahiti "the *teatea mata* was a singular play among the children, who stretched open their eyelids by fixing a piece of straw, or stiff grass, perpendicularly across the eye, so as to force open the lids in a most frightful manner."

34. *Ha-ka mo-a:* "COCK-FIGHTING."—Cocks (*mo-a ka-ne, mo-a*

[1] Op. cit., vol. I, p. 228.

ka-ka-la) are fought on holidays in the public squares, bets of pigs, chickens, cocoanuts, etc., being wagered on the contests. The battles are to the death. The combs are not trimmed, but the spurs are cut off and the cocks fight with their beaks. A good fighting cock costs five dollars. The name is from *ha-ka*, "to fight," and *mo-a*, "a fowl." A drawn game is called *pai-wa-le*, and the assembly at a cockfight, *a-ha-mo-a*.

Ellis[1] states that cock-fighting (*faatito raamoa;* literally, causing fighting among fowls) was the most ancient game among the Tahitians. He remarks:

"The traditions of the people state that fowls have existed in the islands as long as the people, that they came with the first colonists, or that they were made by Taaroa at the same time that men were made. The traditions and songs of the islanders connected with their amusements are as ancient as any in existence among them. They do not appear to have laid bets on their favorite birds, but to have trained and fought them for amusement. The fowls designed for fighting were fed with great care; a finely carved *fatapua*, or stand, was made as a perch for the birds. This was planted in the house, and the bird fastened to it by a piece of cinet, braided flat, that it might not injure the leg. No other substance would have been secure against the attacks of his beak. Their food was chiefly *poe*, or bruised bread-fruit, rolled up in the hand like paste, and given in small pieces. The fowl was taught to open his mouth to receive his food and his water, which was poured from his master's hand. It was also customary to sprinkle water over these birds to refresh them. The natives were universally addicted to this sport. The inhabitants of one district often matched their birds against those of another, or those of one division of a district against those of another. They do not appear to have entertained any predilection for particular color in the fowls, but seem to have esteemed all alike. They never trimmed any of the feathers, but were proud to see them with heavy wings, full-feathered necks, and long tails. They also accustomed them to fight without artificial spurs or other means of injury. In order that the birds might be as fresh as possible, they fought them early in the morning, soon after day-break, while the air was cool, and before they became languid from heat. More than two were seldom engaged at once, and as soon as

[1] Op. cit., vol. 1, p. 221.

one bird avoided the other, he was considered as *vi*, or beaten. Victory was declared in favor of his opponent, and they were immediately parted. This amusement was sometimes continued for several days successively, and, as well as the other recreations, was patronized by their idols. Ruaifaatoa, the god of cock-fighters, appears among the earliest of their inferior divinities."

J. Stanley Gardiner[1] says of Rotuma: "The chiefs used to breed a small cock, somewhat similar to the Malayan fowl; great care was taken in the feeding, and the spur was especially sharpened and oiled. Usually pigs were put up on both sides, and went to the conquerors."

35. *Ho-pu-ho-pu-na-lo :* "DRAGONFLY-CATCHING."—Children catch dragonflies, *pi-nau*, in a net, crying out the number, one, two, three, four, and so on, as they catch them. The one who first gets ten wins. All then stop, and putting the dragonflies in their handkerchiefs, count "one, two, three," and release them.

36. *Le-le-pi-nau :* "DRAGONFLY-FLYING."—Children catch dragonflies and tie them to a string to see which can fly farthest.

37. *Au-waa-lau-ki :* "LEAF-CANOES."—Children fold up *ki* (*Dracena terminalis*) leaves and sail them (Andrews). The name is derived from *au-waa*, a fleet, and *lau-ki*, the leaf of the *ki* plant.

Ellis[2] describes Tahitian children constructing small canoes, boats, or ships, and floating them in the sea. "Although they are rude in appearance," he says, "and soon destroyed, many of the boys display uncommon ingenuity in constructing this kind of toy. The hull is usually made with a piece of light wood of the hibiscus, the cordage of bark, and the sails either of the leaflets of the cocoanut, or the native cloth. They usually fix a stone to the bottom of the little barks, which keeps them upright."

38. *Kii-pe-pe :* "DOLLS."—Little girls make dolls out of stones which they wrap in banana leaves.

39. *Pe-pa pa-a-ni :* "PAPER PLAY."—Children fold paper (*pe-*

[1] *Journal Anthropological Institute*, vol. XXVII, p. 486.

[2] Vol. I, p. 227.

pa) or kapa into a variety of shapes, as a bird, *ma-nu* (see figure 5), which glides down like a bird in the air. Other forms are a box (*po-ho-kui-i*) for pins and needles, and neckties (*lei-a-i*). They also weave strips of kapa into mats, *mo-e-na*, and braid.

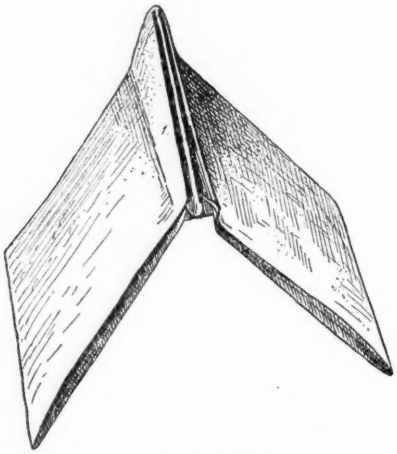


FIG. 5—*Pe-pa ma-nu*, paper bird (No. 21,499, Museum of Archeology, University of Pennsylvania).

40. *Po-ka-kaa:* BUZZ.—The buzz is made of a disk of bark (said to be of the *hau*) perforated with two holes through which a cord is passed. The name means "wheel." Tregear[1] mentions *porotiti*, a New Zealand boy's game of "twirling a disk."

41. *O-e-o-e:* BULLROARER.—This is made of wood, with a hole in one end through which is passed a cord with which it is whirled. It is known to my informants as a toy. They gave as another name, *ko-wa-li-wa-li*. Andrews gives *ko-he-o-he-o* as "an instrument to assist in mourning or wailing along with other sounds."

Codrington[2] describes the use of the bullroarer, under the name of *buro*, in the Mysteries at Florida, and says it is there only that any superstitious character belongs to it. There is no

[1] Op. cit., p. 115.

[2] Op. cit., p. 342.

EXPLANATION OF PLATE XII

a. *I-hi-pa-hee*—Club for game; length, 41 inches. British Museum. (From *Ethnographic Album of the Pacific Islands*, I, 56, No. 1.)

b. *U-lu-mai-ka*; diameter, 3½ inches. British Museum. (From *Ethnographic Album of the Pacific Islands*, I, 55, No. 15.)

c. *Ki-lu*; diameter, 3½ inches. British Museum. (From *Ethnographic Album of the Pacific Islands*, I, 60, No. 14.)

d. *Pu-la-au*—Wood-puzzles. No. 21,446, Museum of Archeology, University of Pennsylvania.

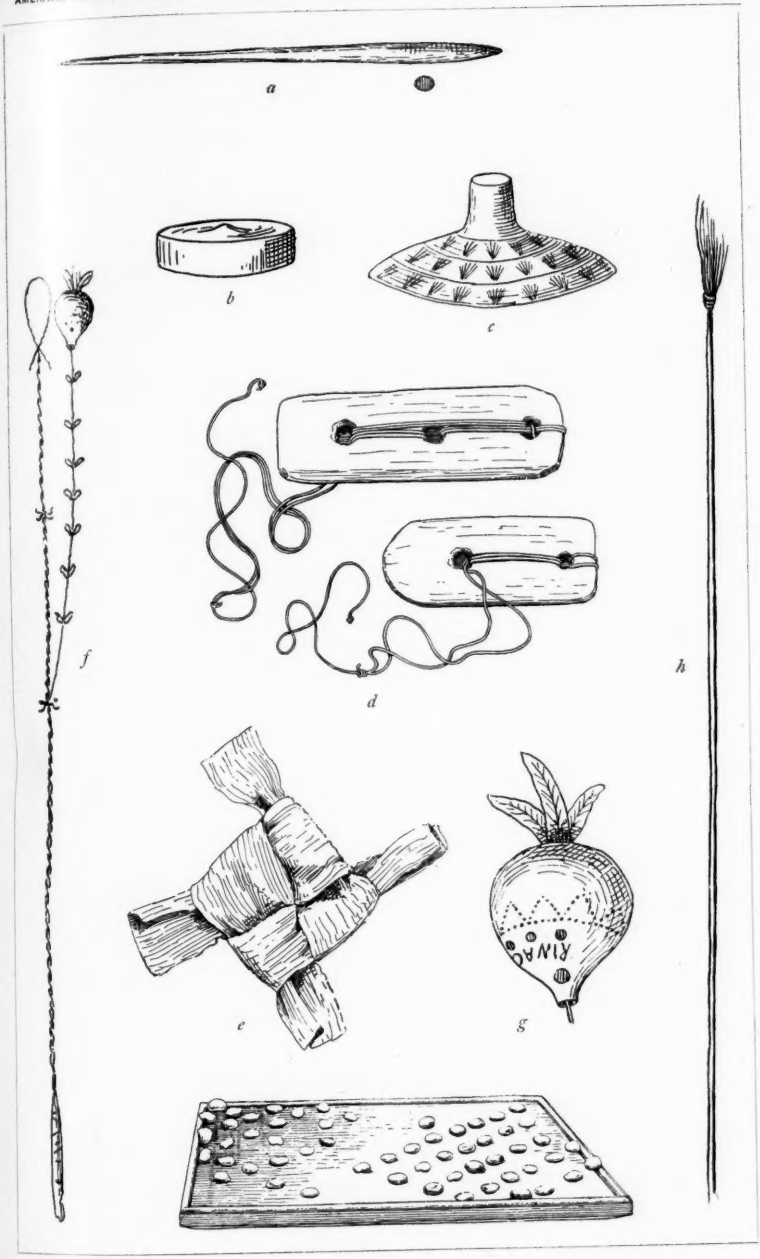
e. *Hu-i-la-ma-ka-ni*—Pin-wheel. No. 21,504, Museum of Archeology, University of Pennsylvania.

f. Cup and ball. (From *Ethnographic Album of the Pacific Islands*, II, 35, No. 1.)

g. Detail of *f*.

h. *Ma-i-le*—Highly polished red-wood rod, with tuft of hair fastened at end; used in *pu-he-ne-he-ne*; length, 36 inches. British Museum. (From *Ethnographic Album of the Pacific Islands*, I, 33, No. 1.)

i. Board and men for *ko-na-ne*. No. 866, Bishop Museum. (After a photograph.)



HAWAIIAN GAMES

mystery about it when it is used in the Banks' islands to drive away a ghost, as in Mota, where it is called *nanamatea*, "death maker," or "to make a mourning sound," and as in Merlav, where it is called *wo-rung-tamb*, "a wailer," and is used the night after a death. It is a common plaything. In Vanua Lava they call it *mala*, "pig," from the noise it makes; in Maewo it is *tal-viv*, a "whirring string"; in Araga it is merely *tavire bua*, a "bit of bamboo."

42. *Hu-i-la-ma-ka-ni:* "WIND-WHEEL," PIN-WHEEL.—A toy made of paper or kapa. The paper pin-wheel is identical with that of Europe, but that of kapa has the form shown in plate XII, *e*.

B. T. Sommerville[1] says that in New Georgia, Solomon islands, "toys of pieces of cocoanut fronds are made for children. Three of these are a 'whirligig,' a 'whistler,' and a 'frigate-bird.' The first is a little windmill, which revolves when presented to the wind; the second, an arrangement of cocoanut leaf which, when violently swung round in the air, gives a sound of a large locust humming."

43. *Hu-o-e-o-e:* HUMMING TOPS.—Humming tops are made of small gourds. Andrews gives *o-ka*, "a top made of a small gourd"; *o-kaa*, "a top," "to spin like a top"; *u-li-li*, "a small gourd used for a top to play with"; and *o-ni-u*, "a top for spinning, a plaything for children, generally made of a cocoanut."

44. *Hu-ko-a:* WOODEN TOPS.—Wooden or peg tops are so called from *hu*, top, and *ko-a* (*Acacia koa*), the wood of which they are made. They have iron points. A top is put in the middle of a ring on the ground and the object of the game is to knock it out.

In New Zealand, according to Taylor,[2] *he poro, he potaka, he kaihora, he kaihotaka*, the whipping top, is another game which is played in every part of the island; the top used is more of a

[1] *Journal Anthropological Institute*, vol. XXVI, p. 409.
[2] Op. cit., p. 172.

cone, and of less diameter than our English one, but in other respects is just the same.

Dieffenbach[1] also says that in New Zealand "a top, called *kaihora*, nicely formed and managed as it is by us, supplies another of their amusements."

Codrington[2] says: "Tops are made in the Solomon islands of the nut of a palm and a pin of wood, the whole visible length of which, between two and three inches long, is below the head. To spin the top, a double string is wound round the shaft, and the two ends pulled smartly asunder. A similar top was used in Pitcairn island by the half Tahitian children of the Bounty mutineers."

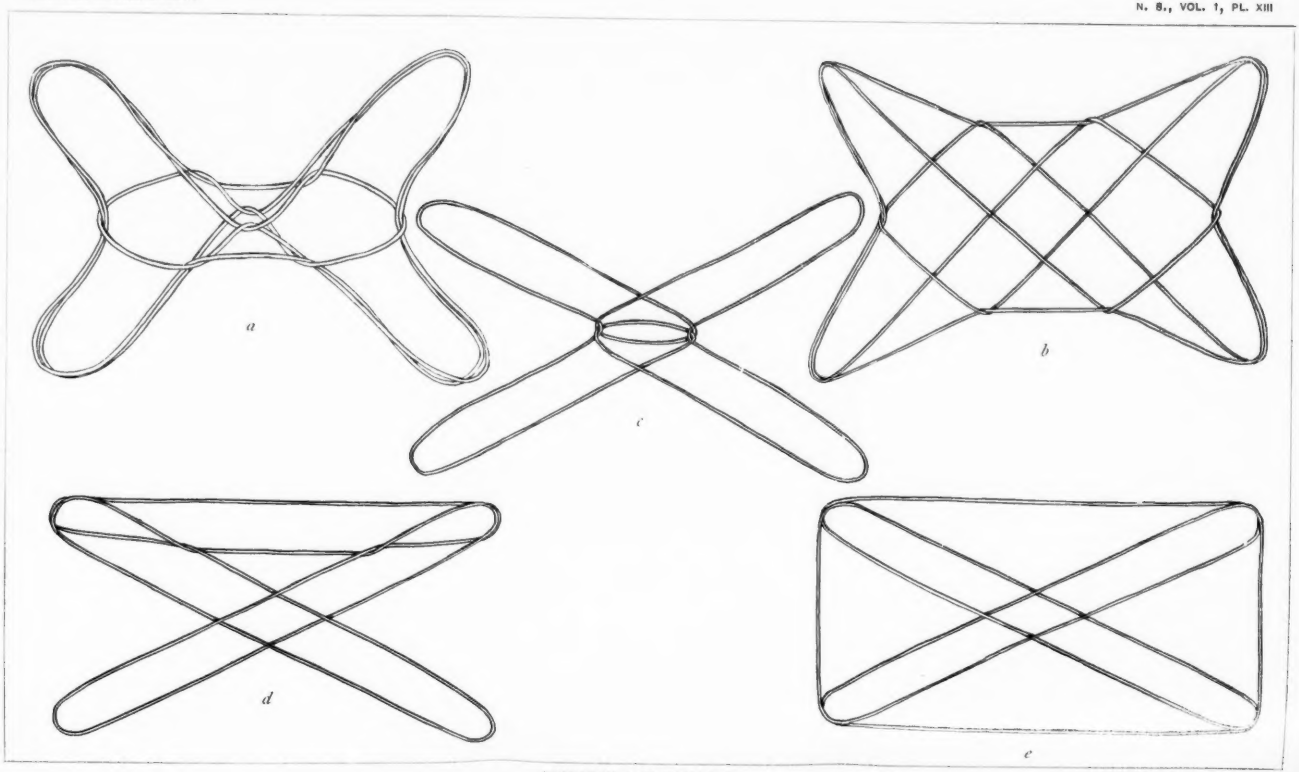
45. *Ha-no:* SQUIRT-GUN.—Squirt-guns are made of bamboo. Boys and girls play with them on holidays, especially on New Year's day. A specimen in the Berlin Museum für Völkerkunde is made of gourd (*i-pu ha-no-ha-no*).

46. *Hu-a ko-pa:* SOAP-BUBBLES.—Soap-bubble blowing is an amusement of children. *Ko-pa* is the Hawaiian pronunciation of soap.

47. *Hei:* CAT'S-CRADLE—A number of cat's-cradles were known to my informants, among which are: (1) *hoo-ko-mo* (plate XIV, *e*); (2) *e-ke-ma-nu*, "ace of diamonds" (plate XIII, *e*); (3) *e-ke-ha-ka*, "ace of hearts" (plate XIII, *a*); (4) *e-ke-pe-ki*, "ace of spades" (plate XIV, *c*); (5) *a-na-ma-nu*, "bird-house" (plate XV, *a*); (6) *pau-ma-wai*, "pump" (plate XIII, *c*); (7) *pa-hi-o-lo*, "saw" (plate XV, *b*); (8) *ma-hi-ki*, "see-saw" (plate XIII, *d*); (9) *wai-u-la-wa* (plate XV, *c*); (10) *ko-he*, "vagina" (plate XIV, *f*); (11) *o-ko-le-a-mo* (plate XIV, *d*); (12) *pa-pi-o-ma-ka-nu-i-nu-i* (plate XIV, *a*); (13) *pa-pi-o-ma-ka-lii-lii* (plate XV, *d*); (14) *u-pe-na*, "net" (plate XIV, *b*); (15) *pou*, "post" (plate XV, *e*); (16) *po*, "darkness" (plate XIII, *b*). Many others are said to be known. A single player makes them with great rapidity, but sometimes another is called on for assistance. The name, *hei*, "net," applied to the game is

[1] Op. cit., vol. II, p. 32.

[2] Op. cit., p. 342.



HAWAIIAN CAT'S-CRADLES

In the Museum of Archeology, University of Pennsylvania.—*a. E-ke-ha-ka*—ace of hearts (No. 21,526); *b. Po*—darkness (No. 21,495); *c. Pau-ma-wai*—pump (No. 21,449); *d. Ma-hi-ki*—see-saw (No. 21,494); *e. E-ke-ma-nu*—ace of diamonds (No. 21,492).

said to be derived from that of our "cradle," which is given that name. The cat's-cradle called *po*, or "darkness," may have had the same significance as that of New Zealand described by Taylor.[1] He says: "*He whai* or *maui*, a game very similar to our own, but the cord is made to assume many more forms, and these are said to be different scenes in their mythology, such as *Hine-nui-te-po*, Mother Night bringing forth her progeny, Maru and the gods, and Maui fishing up the land. Men, canoes, houses, etc., also are represented. Some state that Maui invented the game."

Codrington[2] says: "Cat's-cradle, in Lepers' island *lelegaro*, in Florida *honggo*, with many figures, is common throughout the islands."

48. *Pu-la-au:* WOOD-PUZZLE.—A cord is doubled and passed with a noose through two or three holes in a block of wood (plate XII, *d'*), the object being to remove the block while another person holds the end of the cord. A variation in form is shown in plate XI, *c*, the *pu-waa-pa*, or "canoe" puzzle. Concerning this my informants stated that it illustrated the following story: "King Kamehameha had a daughter named Kea-hi, who became *enceinte* by a lover of low rank. The king ordered her to be placed in a canoe and taken out to sea and exposed to the elements to die. The canoe was secured by a long rope to the land. Her lover swam out to the canoe and unloosened the rope, and the two escaped in the canoe to another island." A puzzle precisely identical with the block with two holes exists in the writer's collection (16,065) from Saharanpore, India, while another (16,080) with two blocks (perforated canes) at each end of the cord was collected from the Accawais Indians of British Guiana. The last is duplicated by a modern French example (15,519) purchased in Paris.

49. *O-ki-kau-la:* STRING-CUTTING.—One person prepares a string which another cuts at a place indicated, whereupon the first puts the two ends in his mouth and withdraws them united.

[1] Op. cit., p. 172.

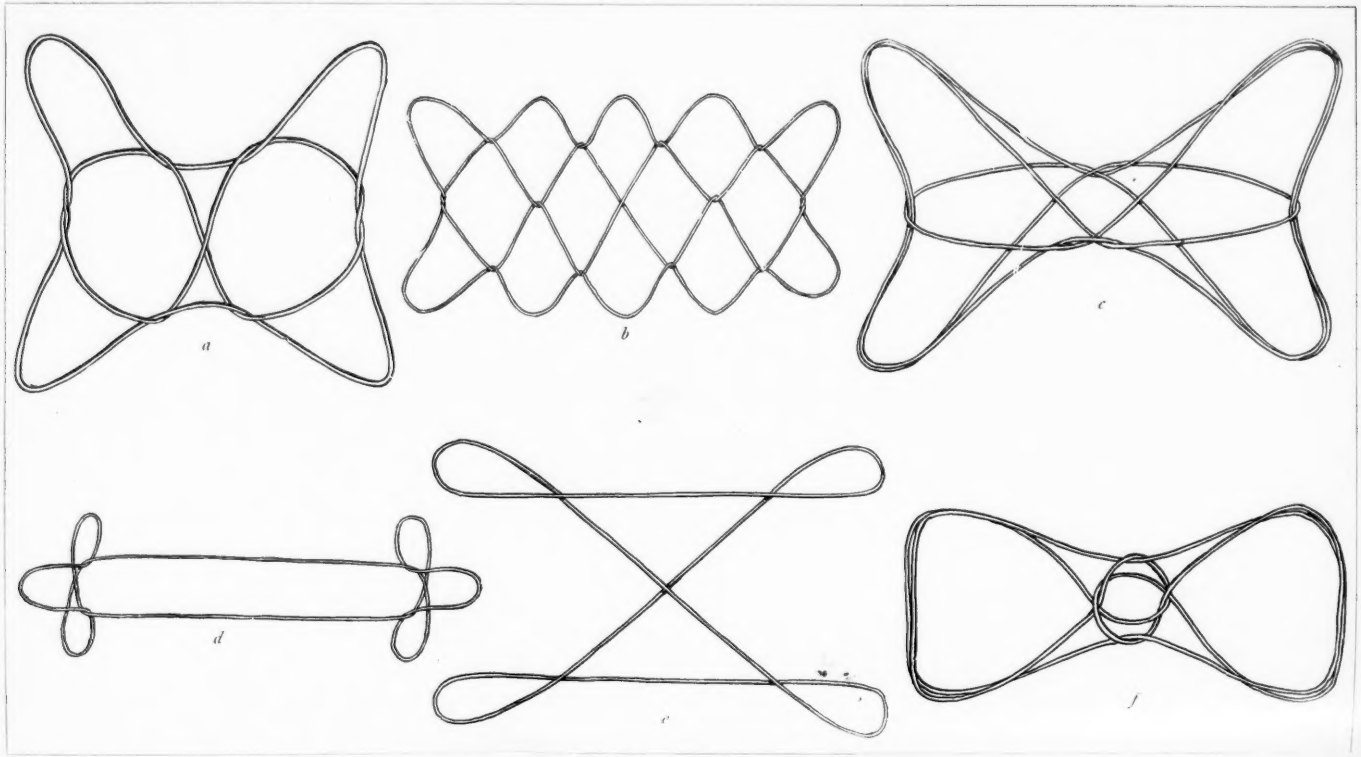
[2] Op. cit., p. 341.

50. *Pu-kau-la.*—A trick of twisting a cord around the fingers or tying it around the arm or leg in such manner that, while seemingly secure, it comes off with a slight pull. The name is from *pu*, and *kau-la*, a rope. *Pu* or *puu* among other meanings is explained by Andrews as "to cast or draw lots (a Hawaiian custom formerly in practice) by using a knotted string." This is a common amusement in Japan, but my Japanese acquaintances have no particular name for it. Dr Bolton tells me that in Austria-Hungary a similar trick is played by *Bauern Fänger* and is called *Kettelziehen.*

51. *Lu-pe:* KITES.—Kites are made of kapa cloth with sticks (*la-au lu-pe*) of *wi-li-wi-li* wood. Six forms were described by my informants: *lu-pe ma-nu*, or "bird kite"; *lu-pe hui-na-ha*, or "four-sided kite"; *lu-pe le-le; lu-pe ho-ku*, "star kite"; *lu-pe ma-hi-ni*, "moon kite"; and *lu-pe ka-na-pi*, "centipede kite." These are illustrated in plate XVI.

The first has a bow of bamboo and two sticks crossed at right angles; the triangles above and below the bow are bound with cord (*kau-la ku-i-na*); tails (*hu-e-lo, we-lo-we-lo*) are fastened at the sides, but none at the extremity. The four-sided kite has two crossed sticks with two binding sticks and is lashed with cord about the edges; it has a long tail with strips of kapa attached, called *kai-kai-a-po-la.* The *lu-pe le-le* (plate XVI, *c*) has a similar long tail. The *lu-pe ho-ku*, or "star kite" (figure *d*) has four sticks crossed in the middle, the edge being formed by a cord tied with a radial cord between each of the sticks. The *lu-pe ma-hi-ni*, or "moon kite" (figure *e*), has three sticks, a long vertical one, crossed by two parallel horizontal sticks, and an exterior hoop of bamboo. Both star and moon kites have tails (*kai-kai-a-po-la*).

The kite strings (*a-ho*) are made of kapa. Men fight kites, one man entangling (*hoo-wi-u-wi-u*) his line with another's and endeavoring to bring down his antagonist's kite. They bet on the result. The kite called *lu-pe le-le* is said to be used invariably for this purpose.



HAWAIIAN CAT'S-CRADLES

In the Museum of Archeology, University of Pennsylvania.— *a*, *Pa-pi-o-ma-ka-nu-i-nu-i* (No. 21,488); *b*, *U-pe-na*— net (No. 21,498); *c*, *E-ke-pe-ki*— ace of spades (No. 21,527); *d*, *O-ko-le-a-mo* (No. 21,512); *e*, *Hoo-ko-mo* (No. 21,491); *f*, *Ko-he*—vagina (No. 21,452).

Concerning kites in Tahiti, Ellis[1] says: "The boys were very fond of the *uo*, or kite, which they raised to a great height. The Tahitian kite was different in shape from the kites of the English boys. It was made of light native cloth instead of paper, and formed in shape according to the fancy of its owner."

Taylor[2] describes the New Zealand kite under the name of *te kahu*, or *he manu waka-tuku-tuku*, *he pakau*. "The name *kahu* is that of a bird like the hawk. Their figure is generally a rough imitation of that bird, with its great outspread wings. These kites are frequently made of very large dimensions of *raupo* leaves, a kind of sedge, neatly sewed together, and kept in shape by a slight frame-work."

Dieffenbach[3] says of the New Zealand kite: "Their kite (*manu* or *pakau pakaukau*) is of a triangular form, and is neatly made of the light leaves of a sedge; it is held by a string made of strips of flax tied together, and its ascent is accompanied with some saying or song. It is a sign of peace when it is seen flying near a village."

Rev. William Wyatt Gill[4] says of kite-flying:

"In times of peace this was the great delight of aged men. Kites were usually five feet in length, covered with native cloth, on which were the devices appropriate to their tribe—a sort of heraldry. The tail was twenty fathoms in length, ornamented with a bunch of feathers and abundance of sere *ti* leaves. Parties were got up of not less than ten kite-flyers, the point of honor being that the kite should fly high and be lost to view in the clouds. Songs made for the occasion were chanted meantime. It was no uncommon event for them to sleep on the mountain, after well securing the kites to the trees. Of course the upshot of all this would be a grand feast, in which the victor got the biggest share. So serious was this employment that each kite bore its own name, and tears of joy were shed by these grey-bearded children as they witnessed the successful flight. When desirous at length of putting an end to their sport, if the wind were too strong to allow the

[1] Op. cit., vol. I., p. 228.
[2] Op. cit., p. 172.
[3] Vol. II., p. 31.
[4] *From Darkness to Light in Polynesia*, London, 1894, p. 39.

string to be pulled in, it was customary to fill a little basket with mountain fern or grass and whirl it along the string. The strong trade winds would speedily convey this 'messenger' to the kites, which then slowly descended to the earth. Children's kites were, and still are, extemporized out of the leaves of the gigantic chestnut tree. Sometimes one sees a boy (no longer grandfathers) flying a properly made kite."

Wilkes[1] says of the Kingsmill islanders, that their kites are made of pandanus-leaf, reduced to half its thickness, which renders it lighter than paper, and they are prettily shaped.

Codrington[2] says: "Kites, used in fishing in the Solomon islands and Santa Cruz, are used as toys in the Banks' islands and New Hebrides, though not commonly of late years. They have their season, being made and flown when the gardens are being cleared for planting. The kite is steadied by a long reed tail, and a good one will fly and hover very well. The name is in Banks' islands *rea*, in Lepers' island *mala*, an eagle."

52. *Hoo-lei-po-po:* CUP AND BALL.—A ball (*po-po*) made of rags of kapa is tied by a cord fastened to the middle of a stick about eight feet long, at the end of which a pocket (*pa-ke-ke*) is attached. The stick is grasped by the other end, and the object is to swing the ball and catch it in the pocket. Two or more play. When one misses, the next takes a turn. The maximum count is one hundred. There are two specimens in the Berlin Museum, one with a kapa and the other with a cocoanut ball. Another (plate XII, *f*) is figured in the *Ethnographic Album of the Pacific Islands*, where it is described as consisting of a light wand of twisted leaf-ribs with a loop at the end. Plate XII, *g*, shows a gourd musical instrument (probably a lover's whistle, *i-pu ho-ki-o-ki-o*) attached by a string ornamented with tufts of feathers.

In Captain King's journal of Cook's voyage to the Pacific ocean,[3] he says that young Hawaiian children have a favorite amusement which shows no small degree of dexterity. They

[1] Vol. V, p. 100. [2] Page 342. [3] Vol. III, p. 147.

take a short stick, with a peg, sharpened at both ends, running through one extremity of it and extending about an inch on each side; and throwing up a ball made of green leaves molded together, and secured with twine, they catch it on the point of the peg; and immediately throwing it up again from the peg, they turn the stick around, and thus keep catching it, on each peg alternately, without missing it, for a considerable time.

53. *Ku-he-le-mai.*—A game played with an awl-shape object, having a wooden handle pointed with a needle which is tossed from the hand, the object being to make it stand erect. The players play in turn, and each continues until he misses. The name is explained by Andrews as from *ku*, "to rise," *he-le*, "to move," and *mai*, "this way."

54. *Nou-nou-pu-ni-u:* COCOANUT-SHELL-CASTING.—A cocoanut is hollowed out and suspended by a cord, and the players throw at it with balls made of kapa. One acts as banker, and pays a prize to a player who hits the cocoanut a certain proportional number of times.

55. *Ki-ni-ho-lo.*—A ball game, described by native informants as played with a rag ball made of kapa, which is struck with the open hand. From *ki-ni*, and *ho-lo*, "to run." Andrews states that it is similar to baseball. He gives *ki-ni-po-po* as a general name for all games of ball.

56. *Pe-ku-ki-ni-po-po:* BALL-KICKING.—A game of football was formerly played with a large ball made of kapa. A hole somewhat larger than the ball was dug in the ground on each side as a goal, and the object of the game was to force the ball into the opponent's hole. Football is now played with a rubber ball, with two posts with a string across at opposite sides as goals. This form is of recent introduction.

57. *Pa-na-pa-na lu-a:* PIT-SHOOTING.—Played by several persons with beans, *pa-pa-pa*, each contributing the same number. A small hole is dug, beside which they put all their beans together. The first player then flips the beans into the hole,

one by one, with his thumb and forefinger, continuing until he misses. The next then follows, and so on in turn until the beans are all flipped in the hole. The one who puts the last bean in wins the game.

58. *Ki-o-la-o-la.*—A play with small stone balls by one person who keeps three in the air at the same time.

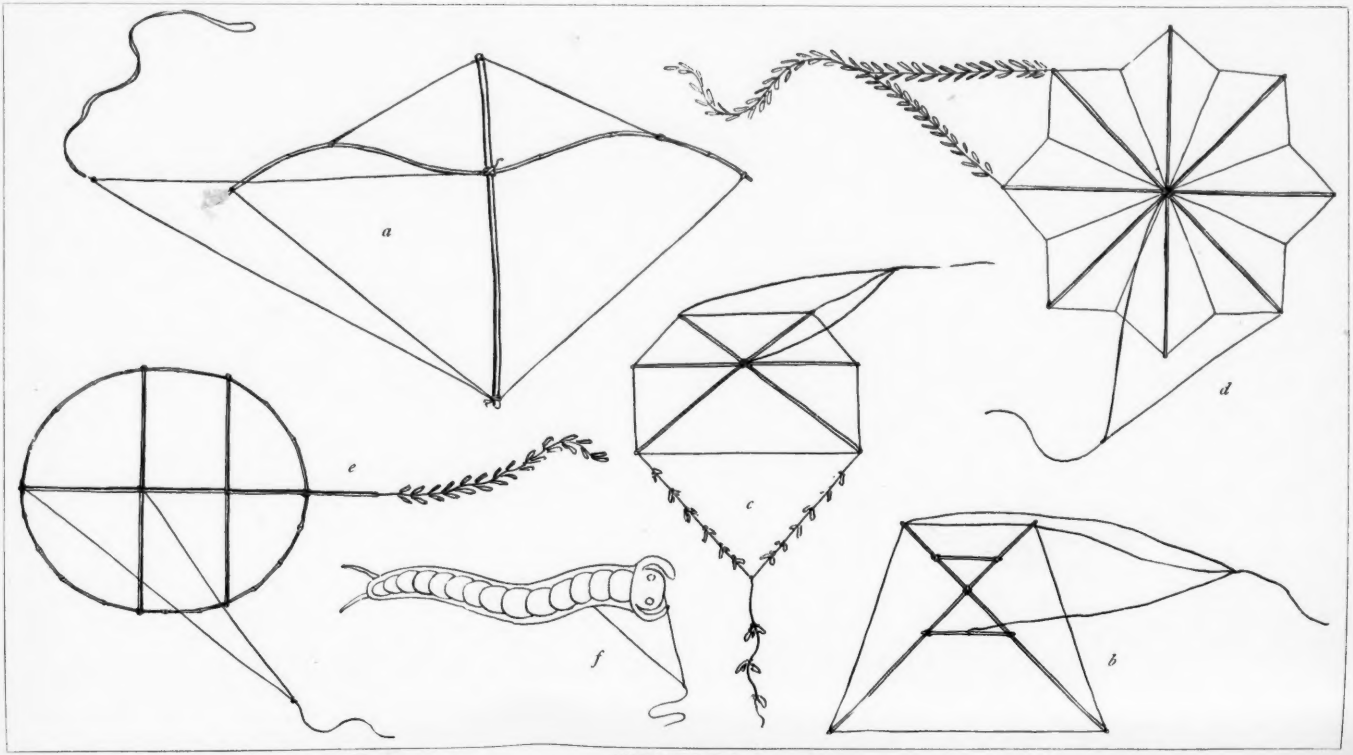
Captain King,[1] speaking of the game with a ball of green leaves, says: "They are not less expert at another game of the same nature, tossing up in the air and catching in their turn a number of these balls; so that we frequently saw little children thus keep in motion five at a time. With this latter play the young people likewise divert themselves at the Friendly islands."

Stair[2] thus speaks of the game in Samoa: "*O fuanga* consisted in throwing up a number of oranges in the air, six, seven, or eight, and the object was to keep the whole number in motion at once as the Chinese jugglers do their balls. *O le teaunga* was also played with a number of oranges, but in this game they were thrown up backwards."

59. *Ki-mo-ki-mo:* JACKSTONES.—Played by two or more persons with a number of small stones (*po-ha-ku*). Each player has his own stone, called *a-li-i*, "chief." The game is practically identical with that played by children in the United States. The stones of all the players are placed on the ground; one begins by tossing his stone up, grabbing the others, tossing them and catching them all together. He continues until he misses. It is employed for gambling purposes. Of this game Ellis[3] says:

"*Timo*, or *timo timo*, was another game [of Tahiti]. The parties sat on the ground, with a heap of stones by their side, held a small round stone in the right hand, which they threw several feet up in the air, and, before it fell, took up one of the stones from the heap, which they held in the right hand till they caught that which they had thrown up, when they threw down the stone they had taken up, tossed the round stone again, and continued taking up a fresh stone every time

[1] Vol. III, p. 147. [2] Page 138. [3] Vol [illegible], p. 227.

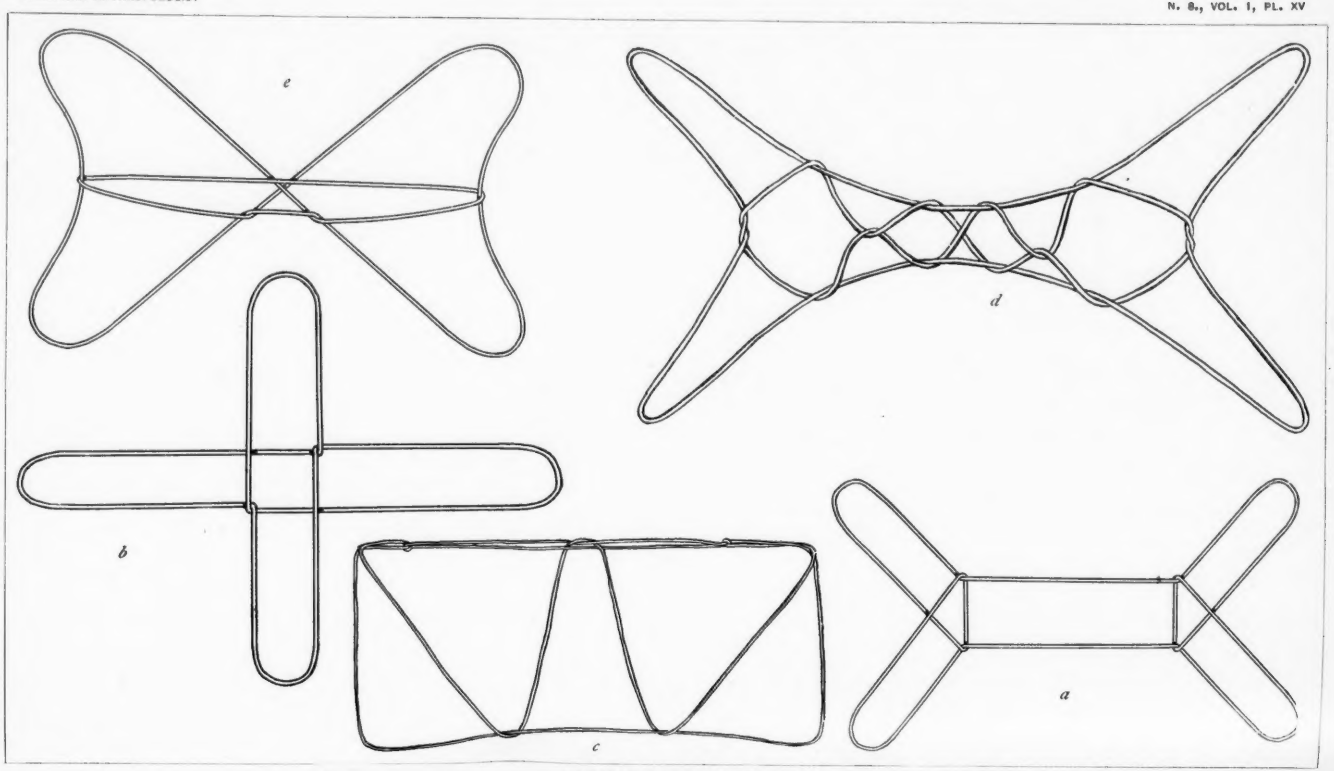


HAWAIIAN KITES

a. *Lu-pe ma-nu*—bird kite (No. 21,454, Museum of Archeology, University of Pennsylvania); *b*. *Lu-pe ku-i-na-ka*—square kite; *c*. *Lu-pe le-le*; *d*. *Lu-pe ho-ku*—star kite; *e*. *Lu-pe ma-hi-ni*—moon kite; *f*. *Lu-pe ka-na-fi*—centipede kite. The last four are from native drawings.

XUM

a. Lu-pe ma-hu—bird kite (No. 21,254, Museum of Archæology and Ethnology, Cambridge); *b. Lu-pe ma-ka-ha-ka-ha*—square kite; *c. Lu-pe ma-hi-ni*—moon kite; *d. Lu-pe ka-ua-hi*—star kite; *e. Lu-pe ma-hi-ni*—moon kite; *f. Lu-pe ka-na-pi*—centipede kite. The last four are from native drawings.



HAWAIIAN CAT'S-CRADLES

In the Museum of Archeology, University of Pennsylvania.—*a*. *A-na-ma-nu*—bird-house (No. 21,497); *b*. *Pa-hi-o-lo*—saw (No. 21,450); *c*. *Wai-u-la-wa*—full breasts (No. 21,496); *d*. *Pa-pi-o-ma-ka-lii-lii* (No. 21,447); *e*. *Pou*—post (No. 21,451).

they threw the small round one into the air, until the whole heap was removed."

Dieffenbach,[1] speaking of New Zealand, says: "Another game is called *tutukai*, and is played with a number of pebbles."

Of the game in Samoa, Wilkes[2] says: "*Lafo litupa* is played by two persons, who place about 50 beans of the *Mimosa scandium* before them; then taking up four at a time, they throw them up in the air, and catch them on the back of the hand; the player who catches 100 soonest is the winner."

Williams[3] describes the *lavo* of the Fijians, "a game at pitching the fruit of the *walai* (*Mimosa scandens*). The fruit is flat and circular, and from its resemblance in form to money, money is also called *ai lavo*."

60. *Pi-li-ka-la:* COIN-BETTING.—This name is applied in particular to two games with coins—"pitching pennies" and "heads or tails." The first is played by several men who draw a line and throw at it, the one whose piece comes nearest, winning. In the second, the players select either heads or tails. They toss for position, and the first player throws all the coins up and takes those that fall as he bet. The game is played with Hawaiian nickels or five-cent pieces. *Ka-la* is the Hawaiian for "dollar"; hence silver, silver coin generally, Andrews gives the general name for gambling and betting as *pi-li-wai-wai*, and says that the ancient forms were almost innumerable. *Wai-wai* means "goods," "property."

61. *Pa-na-pa-na-hu-a:* "SEED-SHOOTING," MARBLES.—The seeds of the *ka-ka-lai-o-a* plant (*Cæsalpina bonducella*), which are nearly spherical, are used as marbles. Any number play, and each puts the same number into a ring on the ground 10 to 12 feet in diameter. They shoot in turn from the edge of the ring, endeavoring to knock the marbles out. When a player knocks one out he may place his taw or shooter (*ki-ni*) in the ring. If a succeeding player who has not knocked a marble chances to

[1] Vol. II, p. 32. [2] Vol. II, p. 136. [3] Page 127.

In the Museum of Archeology, University of Pennsylvania.—*a*, *A-na-na-au*—bird-house (No. 21,497); *b*, *Pa-hi-a-la*—saw (No. 21,450); *c*, *Wai-u-la-ca-a*—full breasts (No. 21,496); *d*, *Pa-pi-o-ma-ka-lii-lii* (No. 21,447); *e*, *Pau*—post (No. 21,451).

hit this shooter he goes out of the game; but if he has knocked a marble out, the one whose shooter is hit forfeits the entire number first put into the ring. The shooters, larger seeds, are valued at five of the ordinary ones which are called *hu-a ma-pa-la* or *hu-a ki-ni-ki-ni*, *hu-a* meaning seed. The game is said to be called also *le-na pa-ka* (*le-na*, "to shoot; *pa-ka*, "to fight").

Dr Edward Palmer collected for our National Museum the seeds of the *Cæsalpina bonducella* in Florida, where, he reports, they are used by children as marbles under the name of "nicker" seeds.

62. *Ki-o-la-o-la-la-au :* "STICK-CASTING," TIP CAT.—Tip cat is played with two sticks made of *ko-a* wood, one about 6 inches in length (*la-au po-ko-le*, "short stick") placed so that its ends rest on the edges of a small hole scooped in the ground, and the other the bat (*la-au hi-li*, "striking stick," or *la-au lo-i-hi*, "long stick"), which is longer. The cat is tossed by thrusting the bat beneath it and striking it in the air. The distance it falls is measured with the bat, and the one who thus first counts one hundred wins the game. The game is also called *pa-a-ni la-au*, from *pa-a-ni*, "to play," and *la-au*, "wood."

Stair[1] refers to "the English schoolboy's game of cat, but played in the water instead of on the land," as among the games of the Samoans.

63. *Ki-no-a :* HOP-SCOTCH.—A diagram is drawn upon the

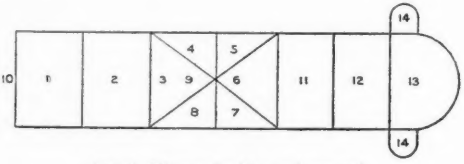


FIG. 6—Diagram for *ki-no-a*, hop-scotch.

ground as shown in figure 6. The players hop on one foot and kick a flat stone into the several divisions in the order indicated

[1] Page 139.

by the numerals. The end (13) is called *la-ni*, "sky" or "heaven," or *pa-lu*. The divisions on each side are called *pe-pei-ao*, "ear."

64. *He-lu-pa-ka-hi:* "ONE-BY-ONE-COUNTING."—Two persons simultaneously put out their fingers and count, first one finger, crying "one;" then two, crying "two," and so on up to ten, repeating ten times. The game is played very rapidly, and if a player makes an error he loses, otherwise the one first completing the count wins. This game is also called *ku-la li-ma*, from *ku-la*, "school," and *li-ma*, "finger," from its being used, presumably, as a school exercise. It is not the same as the Chinese game of *ch'ái múi*, or the Italian *morra*.

Of the Samoan game Stair[1] says: "*O le talinga matua*, also called *O le lupein ga*, was a game of counting, played by two persons sitting opposite each other. One of them held up his closed hand to his companion, and immediately after showed a certain number of fingers, quickly striking the back of his hand upon the mat, directly after. His companion was required to hold up a corresponding number of fingers immediately after, in default of which he lost a point in the game."

J. S. Polack[2] says of the game in New Zealand: "The game of *Ti* is much indulged in. It consists of a party counting in unison with the fingers; on a number being given, the players must instantly touch the finger denoting the said number, and an error in this active performance is productive of much mortification to the native; the dexterity with which it is played can only be accomplished by continual practice."

65. *Pi-li-li-ma:* "HAND-BETTING."—Two players simultaneously extend their closed hands containing marbles, money, or similar small objects, at the same time crying a number. The one who guesses the sum of the objects wins them all.

66. *Pee-pee-a-ku-a:* "GHOST-HIDING," HIDE-AND-SEEK.—The one who is "it," called *a-ku-a*, "ghost" or "god," is determined

[1] Page 138.

[2] *Manners and Customs of the New Zealanders*, London, 1840, vol. II, p. 171.

by counting out. Andrews gives *hau-pee-pee* as the name of the game. In Japan it is called *oni gokko*, "devil playing." Hide-and-seek is referred to by Stair[1] among the amusements of the Samoans, and by Williams[2] as a Fijian game. Taylor[3] mentions hide-and-seek in New Zealand under the name of *he waka pupuni* or *piri*. Codrington[4] says: "In the Banks' island boys play at hide-and-seek, *rur quona quona;* there are two sides, and if the boy who is hiding is not found by the seekers, he suddenly jumps up and counts a pig against them."

67. *He-lu-pa-a-ni:* "PLAY-COUNTING," COUNTING-OUT.—The following counting-out rhymes were related:

Mo-ke mo-ke a-la pi-a
How many *mo-ke a-la pi-a?*
One, two, three, four, *au-ka hi-a.*[5]

Ki-li ki-li ka.

A-ka-hi ou o-i ha
Pa-e-le pa-ki-ni
I-kau-a le-hei pa
Mai no a-la-ea
Mo-mo-na ka-pe-le-na
Ka-i-o-le wi-lu.[6]

68. *Pla-pi-o:* "PRISONER-PLAY," TAG.—The one who is "it" (*a-ku-a*) is determined by counting out. He chases the others, and the one first tagged becomes *a-ku-a* in turn. *Plaa* is the English word "play," Hawaiian *pa-a-ni.*

69. *Ho-lo-pee-a-na-lo.*—A game of hiding played by a number of boys. When all are ready one of the boys pounds on the back of the *a-ku-a*, singing the following song while the others hide:

Ku-i-ku-i ka-mu-mu-mu
Ho-lo i-u-ka ho-lo-kai.

[1] Page 139. [2] Page 127. [3] Page 174. [4] Page 340.

[5] Probably a variant of "Monkey, monkey, bottle of beer, | How many monkeys are there here? | One, two, three, | Out goes he!"—a counting-out rhyme reported by Dr H. Carrington Bolton (*The Counting-out Rhymes of Children*, New York, 1888, p. 116) from many parts of the United States.

[6] Similar to a counting-out rhyme from Hawaii given by Dr Bolton, op. cit., appendix.

70. *Po-ai-pu-ni:* BLIND-MAN'S-BUFF.—Children clasp hands in a ring, within which one stands blindfolded. The children dance around, and as they dance the *ma-ka-po* or "blind-man" catches one and then tries to guess who it is. Ellis[1] says that in Tahiti *tupaurupauru*, a kind of blind-man's-buff, was a favorite juvenile pastime, and Williams[2] mentions blind-man's-buff in Fiji.

71. *Pa-a-ni a-lu a-lu:* PRISONER'S BASE.—A number of boys play, half on a side, each with its base (*pa-hu*). A boy will run out from either side, and those opposite will try to catch him and bring him to their goal. Stair[3] mentions a game played in Samoa by a given number of young men who chose sides, the game appearing to resemble the English game of prisoner's base. J. Stanley Gardiner[4] says that in Rotuma "on moonlight nights the beach is alive with the girls and the boys, singing and playing all sorts of games. A favorite one of these is a sort of 'prisoner's base'; a kind of base is marked off, and then one side hides, while the other side searches for them; they have, if possible, to get back within this base."

72. *Pa-na-i-o-le:* "MICE-SHOOTING."—Shooting mice with bows and arrows, according to Alexander,[5] was engaged in only by chiefs, and connected with religious ceremonies. The bow was never used in war, but only for the above purpose. The deified bones of the chiefs were generally carefully concealed in the most secret and inaccessible caves to prevent their being made into arrows to shoot mice with, or into fish-hooks.

73. *Mo-ko-mo-ko.*—A national sport, practiced on holidays when village champions are opposed to each other. The contestants stand a certain distance apart and throw in succession seven spears, seven stones, seven stone axes with handles, and seven wooden knives, one at the other and then back again. If a player is hit he loses. The game is hazardous and exciting.

[1] Page 228. [2] Page 127. [3] Page 136.
[4] *Journal Anthropological Institute*, vol. XXVII, p. 488.
[5] Vol. I, 91.

Mo-ko-mo-ko is defined by Andrews as "to box; to fence; to fight; to hold boxing matches as pastimes or games."

In New Zealand, Taylor[1] says, *te para mako* consisted in throwing sharp-pointed sticks at each other, and skilfully warding them off by turning the body away when they saw the dart coming. Sometimes an unskilful person lost his life in playing this game.

Codrington[2] says: "In the Solomon islands the great game is throwing and dodging spears, or sticks instead of spears. This is to some extent represented in the Banks' islands by two parties throwing native oranges at each other."

74. *Ke-a-pu-a:* "ARROW-THROWING."—Arrows or darts, consisting of the blossom end of the sugar-cane, are thrown in the following manner: A cord is wrapped around the middle of a cane arrow, the other end being fastened to a stick about four feet long (*la-au-ke-a pu-a*), which is held vertically at right angles to the arrow, which rests on the ground. The latter is then hurled in the air by the stick, the wrapped cord giving it a rotary motion. Four persons play, boys against boys or girls against girls, or two boys against two girls. The one whose arrow goes farthest, wins. It was formerly a man's game. It would appear from Andrews that the fore-end of the *pu-a* was tied with string to prevent splitting. The arrows are also called *pa-pu-a*, from *pa*, "to throw," and *pu-a*, "cane arrow."

Ellis[3] says that in Tahiti a game called *aperea* prevailed. It consisted in jerking a reed, 2½ or 3 feet in length, along the ground. The men seldom played at it, but it was a common diversion of women and children.

Speaking of the amusements of the Samoans, Stair[4] says: "*O le tāngāti'a* was played by many persons at once, each one endeavoring to propel a small light rod of the *fu'a fu'a*, from which the bark had been peeled off as far as possible. The forefinger

[1] Page 173.
[2] Page 341.
[3] Vol. 1, p. 227.
[4] Page 138.

was placed upon the head of the stick, when it was thrown down and caused to glide over the ground to a distance of 30 or 40 yards or more."

Wilkes[1] describes *litia* as a general sport of the Samoans, sometimes whole villages playing against each other. Two parties furnish themselves with light sticks of the *Hisbiscus tiliaceus*, about 8 or 10 feet long and as thick as a finger; the bark is stripped off, making them very light. The two parties arrange themselves in a line, and strive to throw these sticks as far as possible; the party who succeeds in throwing fifty the farthest wins the game. The usual distance to which they throw is about 40 yards, and one would conceive it almost impossible for them to be thrown so far. A grand feast usually terminates the sport, the expense of which is borne by the losing party.

Williams[2] describes an athletic sport in Fiji under the name of *tiqa*, or *ulu-toa*. This game is played by throwing from the forefinger a reed 3 or 4 feet long armed with a 6-inch oval point of heavy wood. The weapon is made to skim along the ground to a distance of 100 yards or more. Nearly every village has near it a long level space kept clear of grass for the practice of this favorite exercise.

J. Stanley Gardiner[3] says that in Rotuma "the Fijian game of *tiqa*, or *ulutoa*, used to be very popular; it is now only played by the boys. Properly it seems to be a Fijian game, and was doubtless introduced from there. It is played by throwing from the forefinger, covered with a piece of cloth, a reed about 4 feet long, armed with a pointed piece of hard and heavy wood, 3 to 6 inches long. It is thrown along the ground, bouncing over it, the winner being he who can throw it furthest."

Taylor[4] describes *heteka*, or *neti*, as a game played in New Zealand with fern stalks, which are darted to see who can throw them the farthest.

[1] Vol. II, p. 136.
[2] Page 128.
[3] *Journal Anthropological Institute*, vol. XXVII, p. 487.
[4] Page 173.

Codrington[1] says:

"A game which belongs to Banks' Island and New Hebrides is *tika*, the Fiji *tiqa*, played with reeds dashed in such a manner upon the ground that they rise in the air and fly to a considerable distance. In some islands, as Santa Maria, a string is used to give impetus, and in some the reed is thrown also from the foot. The game is played by two parties who count pigs for the furthest casts, the number of pigs counted as gained depending on the number of knots in the winning *tika*. There is a proper season for the game, that in which the yams are dug, the reeds on which the yam vines had been trained having apparently served originally for the *tika*. It is remarkable that in Mota a decimal set of numerals is used in this game, distinct from the quinary set used on every other occasion of counting."

75. *Pa-hee*.—According to Ellis[2] this is—

"a favorite amusement with farmers, and common people in general. The *pa-hee* is a blunt kind of dart, varying in length from two to five feet, and thickest about six inches from the point, after which it tapers gradually to the other end. These darts are made with much ingenuity, of a heavy wood. They are highly polished, and thrown with great force or exactness along the level ground, previously prepared for the game. Sometimes the excellence of the play consists in the dexterity with which the *pa-hee* is thrown. On these occasions two darts are laid down at a certain distance, three or four inches apart, and he who, in a given number of times, throws his dart most frequently between these two, without striking either of them, wins the game. At other times it is a mere trial of strength; and those win, who, in a certain number of times, throw their darts farthest. A mark is made in the ground, to designate the spot from which they are to throw it. The players, balancing the *pa-hee* in their right hand, retreat a few yards from this spot, and then springing forward to the mark, dart it along the ground with great velocity. The darts remain wherever they stop, till all are thrown, when the whole party runs to the other end of the floor, to see whose have been the most successful throws. This latter game is very laborious."

Brigham[3] states that the *pa-hee* could be and was used as a weapon (see plate XII, *a*). The material was always *kau-i-la* or

[1] Page 340.

[2] Vol. IV, p. 197.

[3] *Preliminary Catalogue*, part II, p. 59.

u-hi-u-hi wood. Each contestant had ten trials. The same *ka-hu-a*, or course, was also used for *mai-ka* (number 78).

76. *Mo-a.*—This is a game played with a *mo-a*, a club similar to the *pa-hee*, but shorter. In either game there was no exact rule for weight or length of stick, but each player suited his own want. It is described as a prominent means of gambling.

77. *Ka-hu-a-ko-i.*—This is described by Andrews as "a species of pastime on the *ka-hu-a* with the *ko-i*." *Ko-i*, among other things, means a small hatchet. The game appears to be similar to *pa-hee* and *mo-a*. Andrews gives *ko-i* as "the name of a play; a sort of race in sliding."

78. *Mai-ka.*—Described by Brigham [1] as a game played with the *u-lu* or *o-lo-hu*. The first name was current on Hawaii and Kauai, and the latter was known on Maui and Oahu. A smooth alley, or *ka-hu-a*, was required and three forms of the game were common. The first was a trial of strength, or throwing, or rather bowling, to the greatest distance; the second required more skill to drive the *u-lu* between two sticks near the end of the *ka-hu-a;* the third was rather a trial of the *u-lu* than of the players, as they were rolled against each other and the toughest won the game for its owner. There is a famous *ka-hu-a* near Kalae on Molokai, where may be seen hundreds of broken *u-lu*. The players trained carefully and developed great strength. Various kinds of stone were used, but a heavy compact coral rock was the favorite; the *u-lu* was sometimes spherical, but usually a thin cylinder with slightly convex ends (plate XII, *b*). The largest *u-lu* of the first form in the Bishop Museum has a diameter of $7\frac{1}{2}$ inches and weighs 22 pounds. Of the second and more common form the largest is 5 inches in diameter, 3 inches thick, and weighs 44 ounces. The smallest has a diameter of $1\frac{7}{8}$ inches and weighs $3\frac{1}{2}$ ounces. Rough and unfinished *u-lu* were used by children for practice. The average weight was a little over a pound. Choice ones were carefully oiled and kept in kapa. The *u-lu* exhibited in the Bishop Museum

[1] *Preliminary Catalogue*, part II, p. 56.

are made of lava, coral, breccia, conglomerate, limestone, and olivine, and there is one of wood.

Ellis[1] says that the game of *mai-ka* is played upon the same floor as *pa-hee*. Two sticks are stuck in the ground only a few inches apart, at a distance of 30 or 40 yards, and between these, but without striking either, the parties at play strive to throw their stone. At other times the only contention is, who can bowl it farthest along the *ka-hu-a*, or floor. The people are, if possible, more fond of this game than of the *pa-hee*; and the inhabitants of a district not infrequently challenge the people of the whole island, or the natives of one island those of all the others, to bring a man who shall try his skill with some favorite player of their own district or island. On such occasions we have seen seven or eight thousand chiefs and people, men and women, assembled to witness the sport, which, as well as the *pa-hee*, is often continued for hours together.

Andrews gives *ne-we-ne-we-we* as "the exclamations of people when they play at *mai-ka*, while the stone is rolling and they cheer it on." Also *hu-i-pa*, *i-ki-ma-ku-a*, and *ka-la-ma-u-la* as names of species of stone out of which *mai-ka* are made. Andrews also states that since the introduction of bowling alleys *u-lu-mai-ka* has been applied to the game of bowls. My informants say the old game has disappeared, and that they apply the name to the game of bowls with pins.

79. *Ki-lu*.—A play with a small gourd, which was unknown to my native informants. A specimen in the British Museum (plate XII, *c*) is figured in the *Ethnographic Album of the Pacific Islands*, where it is described as a top played at night in a lascivious game. It is spun through the air at a specific object, the forfeit being at the expense of the woman.

Alexander states that the game of *ki-lu* (and *u-me*) was always played at night, in an inclosure made for the purpose, and was connected with many vile associations. The *ki-lu* itself was a

[1] Vol. IV, p. 198.

small gourd of peculiar shape, which was thrown at a stick set up at a distance.

Andrews gives *lo-ha* as a kind of sport in former times, the same as *ki-lu;* also *he-lu-ai* as the office of a person engaged in the play of *ki-lu*, and *hau-na* as the striking of the hand or other substance in playing the *ki-lu*.

80. *Ki-o-la-o-la-le-na:* "RING-CASTING."—A game of casting iron rings over a small stake or pin. The rings are about an inch in interior diameter. Four men play, each with ten rings. The one who puts the most rings on the pin wins the prize. On the birthday of King Kamehameha I, rings made of sections of cocoanut shell (*le-na-ni-u*), wrapped with kapa to prevent their breaking, are used in a similar game, in accordance with old custom. My informants state that stone rings also were anciently used.

81. *Pu-he-ne-he-ne.*—A game in which a stone called a *no-a* was concealed in one of five places (*puu*) under a kapa, the object being to guess under which it was hidden.

Ellis[1] describes it as one of the most popular games of the Hawaiian islands, the favorite amusement of the king and higher order of chiefs, and frequently occupied them whole days together. Those who play sit cross-legged on mats spread on the ground, each holding in his right hand a small elastic rod, *ma-i-le*, about three feet long and highly polished (plate XII, *h*). At the small end of this stick is a narrow slit or hole, through which a piece of dogskin, with a tuft of shaggy hair on it, or a piece of *ti* leaf, is usually drawn. Five pieces of kapa of different colors, each loosely folded up like a bundle, are then placed between the two parties, which generally consist of five persons each. One person is then selected on each side to hide the stone. He who is first to hide it, takes it in his right hand, lifts up the cloth at one end, puts his arm under as far as his elbow, and passing it along several times underneath the five pieces of cloth, which lie in a line contiguous to each other, he finally leaves it under one

[1] Vol. IV, p. 81.

of them. The other party sit opposite, watching closely the action in the muscles of the upper part of his arm; and it is said that adepts can discover the place where the stone is deposited, by observing the change that takes place in those muscles, when the hand ceases to grasp it. Having deposited the stone, the hider withdraws his arm, and with many gestures, separates the contiguous pieces of cloth into five distinct heaps, leaving a narrow space between each. The opposite party, having keenly observed this process, now point with their wands or sticks to the different heaps under which they suppose the stone lies, looking significantly at the same time, full in the face of the man who hid it. He sits all the while, holding his fingers before his eyes to prevent their noticing any change in his countenance, should one of them point to the heap under which it is hidden. Having previously agreed who shall strike first, that individual, looking earnestly at the hider, lifts his rod and strikes a sharp blow across the heap he has selected. The cloth is instantly lifted, and should the stone appear under it, his party have won that hiding with one stroke; if it is not there, the others strike till the stone is found. The same party hide the stone successively, according to their agreement at the commencement of the play; and whichever party discovers it the given number of times, with fewest strokes, wins the game. Sometimes they reverse it; and those win who, in a given number of times, strike the most heaps without uncovering the stone. Occasionally they play for amusement only, but more frequently for money or other articles of value which they stake on the game.

The five *puu* receive the following names: (1) *ki-hi* or *ki-hi-mo-e*, (2) *pi-li* or *pi-li-mo-e*, (3) *kau*, (4) *pi-li-pu-ka*, (5) *ki-hi-pu-ka*. These are regarded as corresponding to the following divisions of the night: (1) sunset (?), (2) 9 oclock in the evening, (3) midnight, (4) 3 oclock in the morning, (5) sunrise (?).

Andrews gives *pu-pu-he-ne*, a row of men in a certain game, presumably *pu-he-ne-he-ne*. He also defines *pe-le*, not only as the name

of a volcano and of the fabled goddess of volcanoes, but also: "4, a stone from a volcano used in the play called *pu-he-ne-he-ne*. See *no-a*."

In Captain King's journal of Cook's voyage to the Pacific ocean,[1] he says: "They have another game which consists in hiding a stone under a piece of cloth, which one of the party spreads out, and rumples in such a manner that the place where the stone lies is difficult to be distinguished. The antagonist, with a stick, then strikes the part of the cloth where he imagines the stone to be; and, as the chances are, upon the whole, considerably against his hitting it, odds of all degrees, varying with the opinion of the skill of the parties, are laid on the side of him who hides." Elsewhere he says: "We observed great numbers of small polished rods, about four or five feet long, somewhat thicker than the rammer of a musket, with a tuft of white dog's hair fixed on the small end. These are, probably, used in their diversions."

Corney[2] says: "They play another game by hiding a stone under three pieces of cloth. Six people play at this game, each party having his stone and cloths and a small wand with which they strike the cloth under which they think the stone is deposited. If they do not guess right the first time, the stone is shifted and so on alternately. I have seen the chiefs sit for a whole day before they decide the game."

A *no-a* in the Bishop Museum (Cat. number 881) is described as the stone of Kalanikupele, the last king of Oahu, who had a large house at Waimanalo where he played this and other games.

My informants stated that this game is not played now in Honolulu, but that they had seen it played by men from Kauai.

J. Stanley Gardiner[3] says that in Rotuma "another favorite amusement on the beach is to make a bank of sand, and out of this to scrape a number of holes in the sand. A piece of coral is then taken in the hand and, while these are filled up, hid in one.

[1] Vol. III, p. 145.
[2] Page 106.
[3] *Journal Anthropological Institute*, vol. XXVII, p. 488.

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When they are tired with the rougher games above, the whole beach may be seen strewn with young people, five or six together, playing this game. The unsuccessful in guessing, in which hole the coral has been placed, will be set on by the others, and covered in sand."

82. *Ko-ho-ko-ho-pu-ni-u :* COCOANUT-SHELL GUESSING.—A button of cocoanut-shell (*pi-hi-ni-u*) is concealed under one of two cups of cocoanut-shell, the object being to guess under which it is hidden.

83. *Hu-na po-ha-ku :* STONE-HIDING.—A number of players stand in a row with their closed hands outstretched, and another endeavors to guess in which hand a stone (*po-ha-ku-maa*, "sling stone") is concealed, slapping the hand he selects. If he guesses correctly, the one who had the stone takes his place.

Taylor[1] describes the following game in New Zealand: "*Tutu kai.*—A circle being formed, one takes a little stone, or anything else, in his hand, and then another repeats a verse. A person then goes around the circle, and guesses in whose hand it is hid, each having his fist closed; if he is right, the person who has the stone, takes his place, and goes round; if he is wrong, he continues until he discovers where it is hid."

84. *Lu-lu.*—Four disks of volcanic stone about an inch in diameter and marked on one side (figure 7) are shaken in both hands and allowed to fall at random on the ground. These dice

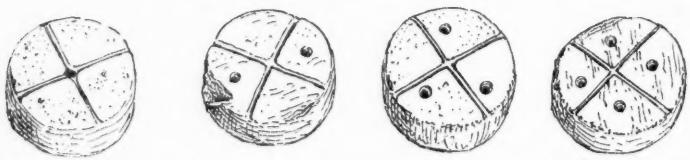

FIG. 7—*U-lu lu-lu*,—stone dice. (No. 21,444, Museum of Archeology, University of Pennsylvania.)

are marked with a cross as shown in the figure, one with a central dot and the others with two, three, and four dots. The dots and crosses are painted red. Any number play, and each player has

[1] Page 174.

two throws, or rather, if any stone comes unmarked side up, he throws it again. The spots count and the highest throw in a round wins; or the game may be played to a fixed number, as one hundred. If a player throws all marked faces up, it counts ten and he has another throw. The dice are called *u-lu*, the same as the stones used in *mai-ka*. *Lu-lu* means to shake. The throws are called as follows:

Hu-li la-lo, "all down."
Hu-ka-hi hu-li i-lu-na, "one turning up."
E-lu-a hu-li i-lu-na, "two turning up."
E-ko-lu hu-li i-lu-na, "three turning up."
E-ha hu-li i-lu-na, "four turning up."

Ordinary cubical dotted European dice receive the same name of *u-lu* or *u-lu lu-lu;* and dice throwing is called *lu-lu*, Three are commonly employed.

85. *Ko-na-ne.*—According to Brigham,[1] a game "played on a flat surface of stone or wood, and somewhat resembling 'fox and geese' or Japanese gobang (*go*). Positions on the *pa-pa-mu* were marked by a slight depression on stone and often by the insertion of bone, usually chicken (sometimes human), in wood. There seems no definite number of places or arrangement. Beach-worn pebbles—coral for white, lava for black—completed the equipment." Two boards in the Bishop Museum (plates XI, *e*, and XII, *i*) are stated to have 180 and 83 places, respectively.

In his journal of Cook's voyage to the Pacific ocean[2] Captain King says: "They have a game very much like our draughts; but, if one may judge from the number of squares, it is much more intricate. The board is about two feet long and is divided into 238 squares, of which there are 14 in a row, and they make use of black and white pebbles, which they move from square to square."

Corney[3] says: "Their national game is draughts, but instead of having twelve men each, they have about forty; the board is

[1] *Preliminary Catalogue*, part II, p. 60.
[2] Vol. III, p. 144.
[3] Page 106.

painted in squares, with black and white stones for men, and the game is decided by one party losing all his pieces."

Andrews defines *ko-na-ne* as a game like checkers, a species of *pu-ni-pe-ke*. The stones are placed on squares, black and white; then one removes one and the other jumps, as in checkers. He gives *pa-pa-mu* as the name of the board on which *ko-na-ne* is played, and *i-li-i-li* as pebbles, small stones, used in playing *ko-na-ne*. Also *hi-u* as the name of the counter, and also to move the *hi-u* in playing *ko-na-ne*. *Hi-u-hi-u* is "to practice sorcery" and also "to play *ko-na-ne*." *Pa-hi-u-hi-u* is the "name of a game like *ko-na-ne*," and "to move by jumping as one does in playing *ko-na-ne*." *Lu-na* is the chief piece in the game *ko-na-ne*.

86. *Moo:* DRAUGHTS.—Played on a board or diagram (*pa-pa ko-na-ne*) of 8 by 8 squares (plate XI, *d*) cut on a flat stone, the alternate squares on which the pieces are placed being marked with crossed diagonal lines. The men (*i-li-i-li*), twelve on each side, consist of red pebbles (*i-li-i-li u-la*) and black pebbles (*i-li-i-li e-le-e-le*), which are placed on the marked squares. The play is identical with our game of draughts, except that a king (*a-li-i*, "chief") can move or jump any number of squares, like the queen in chess. There are little holes, *lu-a*, in the center of the marked squares to hold the stones. A king, or *a-li-i*, is made by putting two stones in the hole. The squares are called *ha-le*, "houses."

The game above described, which was communicated to me by the four natives, is not mentioned by the name of *moo* in Andrews' *Dictionary*. It exactly agrees in the king's move[1] with the game of *dama* or draughts played in the Philippine islands, differing in the men being placed within the squares instead of at the intersection of the lines.

87. *Ma-nu:* FOX AND GEESE.—Played on a diagram cut on a stone, consisting of four rectangles placed around a square to form a

[1] The same as in Polish draughts. Speaking of New Zealand, Tregear says: "Draughts, *mu*, some think an introduced game, but I think it can well be proved to be ancient."

cross, the squares all being crossed with intersecting lines. Thirteen stones (*pa-ka*) are arranged as shown in plate XI, *b*. One of the two players, called *pu-ni-pe-ki*, points with a stick (*la-au*) to one of the unoccupied points. The stones move one square at a time and endeavor to pen up the *pu-ni-pe-ki*, who in turn tries to capture the stones. The stick moves one square and jumps over an adjacent piece when the next square beyond is vacant. The player then cries, *Pe-pe-hi ka-na-ka!* When the stick is cornered the opponent cries, *Paa!* ("tight").

This is no doubt the game referred to by Andrews under the name of *pu-ni-pe-ki* (*bo-ne-pa-te*, *bu-ni-be-ti*), "a game like 'fox and geese.'" It may be that this is a Hawaiian rendering of "Bonaparte," the object of the game being to pen him up. The name *ma-nu*, "bird," is explained by the moves of the stick. Andrews gives *le-le-pu-ni*, "a kind of play with white and black stones on a board," probably referring to this game.

88. *Hu-ki-la-au:* STICK-DRAWING, DRAWING-STRAWS.—One player prepares two slips of wood of uneven length, and the others draw. If the drawer gets the long piece, he wins; if the short piece, he loses.

89. *Pau-nau-we:* JACKSTRAWS.—Some twenty-five or thirty small splints (*la-au*) are allowed to fall in a heap, and the players endeavor to separate them one by one without moving the others. The name means "to divide into parcels or parts."

90. *Ko-ho-ko-ho-pu-aa:* "PIG-GUESSING."—This is a kind of lottery. The principal stake consists of pigs (*pu-aa*). One hundred cards are prepared, on which are written the names of various articles of food, as pig, fowl, banana, bread-fruit, orange, eggs, etc. Twenty persons each draw a card, the object being to get the one marked "pig." If this is not drawn the first time, the drawing is repeated until some one gets it. This lottery is held on a holiday. The prizes are offered by some rich person. The winner gets five pigs. Afterward the assembled company eats the other food that has been provided.

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91. *Pe-pa-ha-kau:* CARDS.—Foreign playing-cards are used. Poker is a favorite game. Five cards are dealt around and the highest hand wins. A player not getting a pair is out of the game. *Pe-pa*, "cards," is the English "paper." *Ha-kau* means "fighting."

LIST OF GAMES

1 *Ko-wa-li*, Jumping-rope.
2 *Le-le-ko-a-li*, Swinging.
3 *Ma-hi-ki*, See-saw.
4 *Ho-lo-li-o*, Horse-riding.
5 *Ku-al-a-poo*, Head-standing.
6 *Pe-le-pe-le*, Boxing.
7 *Ka-ka-pa-hi*, Fencing.
8 *Ku-la-ku-lai*, Wrestling.
9 *U-ma*, Wrist-wrestling.
10 *U-lu-mi i-lo-koo-ke kai*, Wrestling in the sea.
11 *Hu-ki-hu-ki-kau-la*, Rope-pulling.
12 *Hu-ki-hu-ki-a-i*, Neck-pulling.
13 *Hu-ki-hu-ki-li-ma*, Finger-pulling.
14 *Hei-hei-ku-ki-ni*, Foot-racing.
15 *Hei-hei-haa-we*, Burden-racing.
16 *Hei-hei-e-ke*, Sack-racing.
17 *Le-le-wa-wae-ka-hi*, One-foot jumping.
18 *Le-le-le-la-au*, Stick-jumping.
19 *Hei-hei-hu-i-la-ba-la-la*, Wheelbarrow racing.
20 *Hei-hei-au*, Swimming race.
21 *Hei-hei-waa*, Canoe-racing.
22 *Hei-hei-ka-pu*, Tub-racing.
23 *Hei-hei-na-lu*, Surf-racing.
24 *Le-le-ka-wa*, Precipice-jumping.
25 *O-i-li-pu-le-lo.*
26 *Hee-ho-lu-a*, Sledge-sliding.
27 *Ku-ku-lu-a-e-o*, Stilts.
28 *Pai-pai-li-ma*, Hand-clapping.
29 *Ku-hi-ku-hi-ma-ka*, Eye-pointing.
30 *Ku-hi-la-au*, Wood-pointing.
31 *O-lo-lo*, Rubbing.
32 *Hu-i-la-ma-ka-ni.*
33 *O-le-ha.*
34 *Ha-ka mo-a*, Cock-fighting.
35 *Ho-pu-ho-pu-na-lo*, Dragonfly-catching.
36 *Le-le-pi-nau*, Dragonfly-flying.
37 *Au-waa-lau-ki*, Leaf-canoes.
38 *Kii-pe-pe*, Dolls.
39 *Pe-pa pa-a-ni*, Paper play.
40 *Po-ka-kaa*, Buzz.
41 *O-e-o-e*, Bullroarer.
42 *Hu-i-la-ma-ka-ni*, Windwheel.
43 *Hu-o-e-o-e*, Humming-tops.
44 *Hu-ko-a*, Wooden tops.
45 *Ha-no*, Squirt-gun.
46 *Hu-a ko-pa*, Soap-bubbles.
47 *Hei*, Cat's-cradle.
48 *Pu-la-au*, Wood-puzzle.
49 *O-ki-kau-la*, String-cutting.
50 *Pu-kau-la.*
51 *Lu-pe*, Kites.
52 *Hoo-lei-po-po*, Cup and ball.
53 *Ku-he-le-mai.*
54 *Nou-nou-pu-ni-u*, Cocoanut-shell-casting.

55 *Ki-ni-ho-lo*, Ball.
56 *Pe-ku-ki-ni-po-po*, Ball-kicking.
57 *Pa-na-pa-na-lu-a*, Pit-shooting.
58 *Ki-o-la-o-la.*
59 *Ki-mo-ki-mo*, Jackstones.
60 *Pi-li-ka-la*, Coin-betting.
61 *Pa-na-pa-na-hu-a*, Seed-shooting.
62 *Ki-o-la-o-la-la-au*, Stick-casting.
63 *Ki-no-a*, Hop-scotch.
64 *He-lu-pa-ka-hi*, One-by-one-counting.
65 *Pi-li-li-ma*, Hand-betting.
66 *Pee-pee-a-ku-a*, Ghost-hiding; Hide-and-seek.
67 *He-lu-pa-a-ni*, Play-counting.
68 *Pla-pi-o*, Prisoner's play.
69 *Ho-lo-pee-a-na-lo.*
70 *Po-ai-pu-ni*, Blind-man's-buff.
71 *Pa-a-ni a-lu a-lu*, Prisoner's base.
72 *Pa-na-i-o-le*, Mice-shooting.
73 *Mo-ko-mo-ko.*
74 *Ke-a-pu-a*, Arrow-throwing.
75 *Pa-hee.*
76 *Mo-a.*
77 *Ka-hu-a-ko-i.*
78 *Mai-ka.*
79 *Ki-lu.*
80 *Ki-o-la-o-la-le-na*, Ring-casting.
81 *Pu-he-ne-he-ne.*
82 *Ko-ho-ko-ho-pu-ni-u*, Cocoa-nut shell guessing.
83 *Hu-na po-ha-ku*, Stone-hiding.
84 *Lu-lu.*
85 *Ko-na-ne.*
86 *Moo*, Draughts.
87 *Ma-nu*, Fox and geese.
88 *Hu-ki-la-au*, Stick-drawing.
89 *Pau-nau-we*, Jackstraws.
90 *Ko-ho-ko-ho-pu-aa*, Pig-guessing.
91 *Pe-pa-ha-kau*, Cards.

AN ANOMALOUS ULNA—SUPRA-CAPITAL FORAMEN

By ALEŠ HRDLIČKA

The bone here described was found by the writer in a burial cave in the Sierra Madre, in Chihuahua, Mexico.[1] This large *cueva de los muertos*, which was made by river action in very ancient time, is situated about four miles southwestward from Guachochic, a place consisting of only a single rancho, the seat of the local *gobernador* of the Tarahumare Indians. It is a long day's journey by muleback to the southwest of the town of Carichic, which latter place is two days' *diligencia* journey west of the city of Chihuahua.

The cave is situated in the picturesque valley of the Arroyo de las Iglesias. It is a very large, widely open cavern, which, when I visited it, contained numberless human bones, both fragmentary and entire, partly covered with stones or earth, partly lying on the surface. A tradition is current that the cave was once full of mummified bodies; but the saltpeter digger came, perhaps also the hunter for buried gold, and, aided by rats and other animals, the mummies were dissociated and the bones strewn about. Then came the superstitious Indian from the neighborhood, who so dreads the harmful *muertos* that he cannot sleep in their neighborhood at night, hearing them singing and dancing, and he threw piles of stones on the bones until they were either broken or buried from sight. These facts have such a bearing on the specimens which I am to describe, that I was unable to obtain any other part of the skeleton to which the anomalous ulna belonged, and therefore cannot say whether the

[1] *On the Lumholtz-Hrdlička Expedition to Mexico under the Auspices of the American Museum of Natural History*; New York, March–July, 1898.

AN ANOMALOUS ULNA—SUPRA-CAPITAL FORAMEN

anomaly was unilateral or bilateral, or what irregularities of structure, if any, were shown by other parts of the skeleton.

The ethnological nature of the bones occurring in the cave mentioned is not yet fully determined. Undoubtedly the burial place is a very old one, for many of the bones, even those which were still buried deeply in the earth and could not have been denuded by animals, do not show even a trace of the dry, tough, mummified tissues which for centuries cling to bones in similar locations. However, the whole surrounding country is, and was, so far as any data or traditions go, occupied by the same tribe of Indians—the Tarahumare—hence in all probability the bones belong to the ancestors of these people.

The ulna here described lay bare on the nitrous earth, and attracted my attention by a peculiar large foramen situated just above its inferior extremity. The bone is apparently that of a male; it shows pronounced curvatures, as do many of the Indian ulnæ; it is strong, though not excessively so, and up to its head and neck it is entirely normal.

The carpal extremity of the bone shows the following conditions: The styloid process is short; the articular facet on the head, which is usually more or less semilunar in shape with the concavity toward the styloid process, is in this case irregularly circular, with the lateral width greater than the antero-posterior. A few millimetres below the head is situated a well developed, regular, spacious foramen in the bone. The foramen measures 8 mm. in height by 6 mm. in width; its base and internal side rest on the head and the neck of the ulna, while externally the opening is completed by a span of bone 2 mm. thick and 4 mm. broad in its narrowest part. The bone of the span is entirely normal; the proximal extremity of the bridge is continuous with the shaft of the bone and the interosseous ridge, respectively; while the distal extremity of the bridge, widening considerably, blends imperceptibly with the head of the ulna. There is absolutely no sign of any injury on the lower portion of the ulna.

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There are no pronounced indications as to what function the anomalous foramen may have served. The inner walls of the opening are smooth; internally on the shaft there are a low vertical ridge and a parallel shallow depression, as well as numerous small foramina for blood-vessels. The borders of the opening are quite smooth. The surrounding bone shows no trace of any groove or depression.

The interpretation of a large, well developed foramen in such a situation is difficult. Three theories suggest themselves as to its function. The foramen may have served for the transmission of an artery, or a tendon may have passed through it, or it may have lodged some sort of benign growth. No one of these theories is without possible objection. The borders of the foramen are hardly as smooth as they would be had they transmitted some erratic tendon or artery, and outside of its borders there is no trace of any groove such as a large artery or a tendon would produce. As to tumor, there is very little if any excavation or absorption of the walls in the opening, and no thickening of the bone.

The formation must have taken place very early in the life of the individual, as the form of the entire head of the ulna is affected. In all probability the anomaly of the foramen is due to congenital causes.

THE WINTER SOLSTICE ALTARS AT HANO PUEBLO

By J. WALTER FEWKES

Introduction

The fetishes displayed in their kivas by different phratries during the Winter Solstice ceremony at the Hopi pueblo of Walpi, in northeastern Arizona, have been described in a previous article,[1] in which the altar made in the *Moñkiva*, or "chief" ceremonial chamber, by the *Patki* and related people has been given special attention. The author had hoped in 1898 [2] to supplement this description by an exhaustive study of the Winter Solstice ceremonies of all the families of the East Mesa, but was prevented from so doing by the breaking out of an epidemic. This study was begun with fair results, and before withdrawing from the kivas he was able to make a few observations on certain altars at Hano which had escaped him in the preceding year.

Walpi, commonly called by the natives *Hopiki*, "Hopi pueblo," began its history as a settlement of Snake clans which had united with the Bear phratry. From time to time this settlement grew in size by the addition of the *Ala*, *Pakab*, *Patki*, and other phratries of lesser importance. Among important increments in modern times may be mentioned several clans of Tanoan ancestry, as the *Asa*, *Honani*, and the like. These have all been assimilated, having lost their identity as distinct peoples and become an integral part of the population of Walpi, or of its colony, Sitcomovi.[3] Among the most recent arrivals in Tusayan

[1] *The Winter Solstice Ceremony at Walpi* (*American Anthropologist*, vol. XI).

[2] These studies were made under the auspices of the Bureau of American Ethnology.

[3] Most of the people of Sitcomovi are of the *Asa* and *Honani* clans, of Tanoan ancestry, but they long ago lost the Tewa language and their Tanoan identity.

was another group of Tanoan clans which will be considered in this article. The last mentioned are now domiciled in a pueblo of their own called Hano; they have not yet, as the others, lost their language nor been merged into the Hopi people, but still preserve intact many of their ancient customs.

The present relations of Hano to Walpi are in some respects not unlike those which have existed in the past between incoming clans and Walpi as each new colony entered the Tusayan territory. Thus, after the *Patki* people settled at the pueblo called Pakatcomo,[1] within sight of Old Walpi, they lived there for some time, observing their own rites and possibly speaking a different language much as the people of Hano do today. In the course of time, however, the population of the *Patki* pueblo was united with the preëxisting Walpi families, Pakatcomo was abandoned, and its speech and ritual merged into those of Walpi. Could we have studied the *Patki* people when they lived at their former homes, Pakatcomo or Homolobi, we would be able to arrive at more exact ideas of their peculiar rites and altars than is now possible. Hano has never been absorbed by Walpi as the *Patki* pueblos were, and the altars herein described still preserve their true Tanoan characteristics. These altars are interesting because made in a Tanoan pueblo by Tewa clans which are intrusive in the Hopi country, and are especially instructive because it is held by their priests that like altars are or were made in midwinter rites by their kindred now dwelling along the Rio Grande in New Mexico.

The midwinter rite in which the altars are employed is called *Tûñtai* by the Tewa, who likewise designate it by the Hopi name *Soyaluña*. This latter term may be regarded as a general one applied to the assemblages of different families in all the kivas of the East Mesa at that time. The name of the Tewa rite is a

[1] The site of this last settlement of the *Patki* people, before they joined those of Walpi, is in the plain about four miles south of the East Mesa. The ruins of the pueblo are still visible, and the foundation walls can readily be traced.

special one, and possibly the other families who assemble at this time once had or still retain their own names for their celebrations. The *Tûñtai* altars were brought by the ancestors of the present people of Hano from their old eastern home, and the rites about them are distinctly Tewan, although celebrated at the same time as the Winter Solstice ceremonies of the Hopi families.

Clan Composition of Hano

The pueblo called Hano is one of three villages on the East Mesa of Tusayan and contained, according to the writer's census of 1893, a population of 163 persons. It was settled between the years 1700 and 1710 by people from Tcewadi, a pueblo situated near Peña Blanca on the Rio Grande in New Mexico. Although only six persons of pure Tanoan ancestry are now living at Hano, the inhabitants still speak the Tewa dialect and claim as kindred the peoples of San Juan, Santa Clara, San Ildefonso, Pojoaque, Nambe, and Tesuque.[1] The best traditionists declare that their ancestors were invited to leave their old home, Tcewadi, by the Snake chief of Walpi, who was then pueblo chief of that village. They claim that they made their long journey to give aid against the Ute Indians who were raiding the Hopi, and that they responded after four consecutive invitations. The Walpi Snake chief sent them an embassy bearing prayer-sticks as offerings, and although they had refused three invitations they accepted the fourth.

According to traditions the following clans have lived in Hano, but it is not stated that all went to the East Mesa together from Tcewadi: *Okuwuñ*, Rain-cloud; *Sa*, Tobacco; *Kolon*, Corn; *Tenyük*, Pine; *Katcina*, Katcina; *Nañ*, Sand; *Kopeeli*, Pink Shell; *Koyanwi*, Turquoise; *Kapolo*, Crane; *Tuñ*, Sun; *Ke*,

[1] The Hano names of these pueblos are—San Juan, ——; Santa Clara, *Kap'a*; San Ildefonso, *Pocuñwe*; Pojoaque, *P'okwode*; Nambe, *Nâme*; Tesuque, *Tetsogi*. They also claim Taos (*Tawile*) and Picuris (*Ohke*), but say that another speech is mixed with theirs in these pueblos.

Bear; *Te*, Cottonwood; *Tayek* (?); *Pe*, Firewood; and *Tceta*, Bivalve shell.

The early chiefs whose names have been obtained are Mapibi of the *Nañ-towa*, Potañ of the *Ke-towa*, and Talekweñ and Kepo of the *Kolon-towa*. The present village chief is Anote of the *Satowa* or Tobacco clan.[1]

Of the original clans which at some time have been with the Hano people, the following have now become extinct: *Kopeeli*, *Koyanwi*, *Kapolo*, *Tuñ*, *Tayek*, *Pe*,[2] and *Tceta*. The last member of the *Tuñ* or Sun people was old chief Kalacai who died about four years ago. It is quite probable that several of these extinct clans did not start from Tcewadi with the others. There were several waves of Tanoan emigrants from the Rio Grande region which went to Tusayan about the same time, among which may be mentioned the *Asa*, which took a more southerly route, via Zuñi. The route of the *Asa* people will be considered in another article, and the evidences that some of the *Asa* clans joined their kindred on their advent into Tusayan will be developed later. Probably certain members of the *Katcina* clan accompanied the *Asa* people as far as the Awatobi mesa and then affiliated with the early Hano clans.[3]

The census of Hano in December, 1898, was as follows:

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[1] The Tewa of Hano call the Hopi *Koso*, and the Hopi speak of the Hano people as the *Towa* or the *Hanum-nyûmû*. The word "Moki," so constantly used by white people to designate the Hopi, is never applied by the Hopi to themselves, and they strongly object to it. The dead are said to be *moki*, which enters into the formation of verbs, as *tconmoki*, to starve; *tcinmoki*, to be very lonesome, etc. The name *Hano* or *Hanoki* is, I believe, simply a combination of the words *Hano* and *ki*, "eastern pueblo." The element *hano* appears also in the designation for American, *Pahano*, "eastern water"; *pahanoki*, "American house." Both the Asa and the Tewa peoples are called *Hanum* clans.

[2] Remains of old reservoirs, elaborately walled, from which water was drawn by means of a gourd tied to a long pole, are still pointed out near Tukinovi and are said to have belonged to the *Pe-towa*. Old Tcasra claims that they were in use in his mother's grandmother's time.

[3] The troubles following the great rebellion of 1680 drove many Tewa from the Rio Grande valley to Tusayan.

Clans	*Males*	*Females*	*Total*
Okuwuñ.....	12	8	20
Sa.....	8	5	13
Kolon.....	11	12	23
Tenyük.....	12	16	28
Ke.....	5	10	15
Katcina.....	8	9	17
Te.....	5	4	9
Nañ.....	4	7	11
Total native to Hano domiciled at home...			136

The above enumeration of Hano population does not include Walpi and Sitcomovi men married to Hano women (23), nor Tewa men living in the neighboring pueblos (15).[1] Adding these, the population is increased to 174, which may be called the actual enumeration at the close of 1898. Subsequent mortality due to smallpox and whooping-cough will reduce the number below 160.

In the following lists there are arranged, under their respective clans, the names of all the known inhabitants of Hano. There have been several deaths since the lists were made (December 1, 1898), and several births which also are not included. It will be noted that the majority have Tanoan names, but there are several with names of Hopi origin, for in these latter instances I was unable to obtain any other.[2]

Census of Hano by Clans

Okuwuñ-towa, or Rain-cloud clan.—Men and boys: Kalakwai, Kala, Tcüa, Wiwela, Kahe, Yane, Solo, Yunci, Pade, Klee, Kochayna, Këe (12). Women and girls: Sikyumka, Kwentce,

[1] It is impossible to make this enumeration accurate, hence these numbers must be regarded as approximations.

[2] It is not unusual to find several names applied to the same person. Thus, Hani, the chief of the *Piba* clans at Walpi, is called Lesma in the Snake kiva. The Walpi call the author Nakwipi, but the Flute chief at Cipaulovi insists that his name is Yoyowaiamû, which appellation was given when the author was inducted into the Flute rites at that pueblo in 1891.

Talitsche, Yoyowaiolo, Pobitcanwû, Yoanuche, Asou, Tawamana (8). Total, 20.

Sa-towa, or Tobacco clan.—Men and boys: Anote, Asena, Temĕ, Ipwantiwa, Howila, Nuci, Yauma, Satee (8). Women and girls: Okañ, Heli, Kotu, Kwañ, Mota (5). Total, 13.

Kolon-towa, or Corn clan.—Men and boys: Polakka, Patuñtupi, Akoñtcowu, Komaletiwa, Agaiyo, Tcidĕ, Oba, Toto, Peke, Kelo, Tasce (11). Women and girls: Kotcaka, Talikwia, Nampio, Kweñtcowû, Heele, Pelé, Kontce, Koompipi, Chaiwû, Kweckatcañwû, Awatcomwû, Antce (12). Total, 23.

Tenyük-towa, or Pine clan.—Men and boys: Tawa, Nato, Wako, Paoba, Topi, Yota, Pobinelli, Yeva, Tañe, Lelo, Sennele, Poctce (12). Women and girls: Toñlo, Hokona, Kode (?), Sakpede, Nebenne, Tabowüqti, Pohĕ, Saliko, Eye, Porkuñ, Pehta, Hekpobi, Setale, Naici, Katcine, Tcenlapobi (16). Total, 28.

Ke-towa, or Bear clan.—Men and boys: Mepi, Tae, Tcakwaina, Poliella, Tegi (5). Women and girls: Kauñ, Kalaie, Pene, Tcetcuñ, Kala, Katcinmana, Selapi, Tolo, Pokona, Kode (10). Total 15. Tcaper ("Tom Sawyer") may be enrolled in this or the preceding family. He is a Paiute, without kin in Hano, and was sold when a boy as a slave by his father. His sisters were sold to the Navaho at the same time. Tcaper became the property of an Oraibi, later of a Tewa man, now dead, and so far as can be learned is the only Paiute now living at Hano.

Katcina-towa.—Men and boys: Kwevehoya, Taci, Avaiyo, Poya, Oyi, Wehe, Sibentima, Tawahonima (8). Women and girls: Okotce, Kwenka, Awe, Peñaiyo, Peñ, Poñ, Tcao, Poschauwû, Sawiyû (9). Total, 17.

Te-towa, or Cottonwood clan. Men and boys: Sania, Kuyapi, Okuapin, Ponyin, Pebihoya (5). Women and girls: Yunne, Pobitche, Poitzuñ, Kalazañ (4). Total, 9.

Nañ-towa, or Sand clan.—Men and boys: Puñsauwi, Pocine, Talumtiwa, Cia (4). Women and girls: Pocilipobi, Talabensi, Humhebuima, Kae, Avatca, "Nancy," Simana (7). Total, 11.

The present families in Hano are so distributed that the oldest part of the pueblo is situated at the head of the trail east of the *Moñkiva*. This is still owned and inhabited by the *Sa*, *Kolon*, and *Ke* clans, all of which probably came from Tcewadi. The *Katcina* and related *Tenyŭk*, as well as the *Okuwuñ* and related *Nañ* clans, are said, by some traditions, to have joined the Tewa colonists after they reached the Hopi mesas, and the position of their houses in respect to the main house-cluster favors that theory. Other traditions say that the first pueblo chief of the Tewa was chief of the *Nañ-towa*. Too much faith should not be put in this statement, notwithstanding the chief of the *Tewakiva* belongs to the *Nañ-towa*. It seems more probable that the *Ke* or Bear clan was the leading one in early times, and that its chief was also *kimoñwi* or governor of the first settlement at the foot of the mesa.

Tewa Legends

According to one authority (Kalakwai) the route of migration of the Hano clans from their ancient home, Tcewadi, led them first to Jemesi (Jemez), where they rested a year. From Jemesi they went to Orpinpo or Pawikpa (" Duck water "). Thence they proceeded to Kepo, or Bear spring, the present Fort Wingate, and from this place they continued to the site of Fort Defiance, thence to Wukopakabi or Pueblo Ganado. Continuing their migration they entered Puñci, or Keam's canyon, and traversing its entire length, arrived at Isba, or Coyote spring, near the present trail of the East Mesa, where they built their pueblo. This settlement (Kohti) was along the foot-hills to the left of the spring, near a large yellow rock or cliff called Sikyaowatcomo (" Yellow-rock mound "). There they lived for some time, as the debris and ground-plan of their building attest. Their pueblo was a large one, and it was conveniently near a spring called Uñba, now filled up, and Isba, still used by the Hano people.

Shortly after their arrival Ute warriors made a new foray on

the Hopi pueblos, and swarmed into the valley north of Wala,[1] capturing many sheep which they drove to the hills north of the mesa.[2] The Tewa attacked them at that place, and the Ute warriors killed all the sheep which they had captured, making a protecting rampart of their carcasses. On this account the place is now called Sikwitukwi ("Meat pinnacle"). The Tewa killed all but two of their opponents who were taken captives and sent home with the message that the Bears had come, and if any of their tribe ever returned as hostiles they would all be killed. From that time Ute invasions ceased.

According to another good authority in Tewa lore, the *Asa* people left "Kaëkibi," near Abiquiu, in northern New Mexico, about the time the other Tewa left Tcewadi. They traveled together rapidly for some time, but separated at Laguna, the *Asa* taking the southern route, via Zuñi. The Tewa clans arrived first (?) at Tusayan and waited for the *Asa* in the sand-hills near Isba. Both groups, according to this authority, took part in the Ute fight at Sikwitukwi, and when they returned the village chief of Walpi gave the *Asa* people for their habitation that portion of the mesa top northeast of the *Tewakiva*, while the present site of Hano was assigned to the Tewa clans. During a famine the *Asa* moved to Tübka (Canyon Tsegi, or "Chelly"), where they planted the peach trees that are still to be seen. The ruined walls east of Hano are a remnant of the pueblo abandoned by them. The *Asa* intermarried with the Navaho and lost their language. When they returned to the East Mesa the Hopi assigned to them for their houses that part of Walpi at the head of the stairway trail on condition that they would defend it."[3]

[1] The gap in the East Mesa just at the head of the trail before one enters Hano. The pueblo of Walpi derived its name from this gap.

[2] Their nomadic enemies raided so near the pueblo of the East Mesa that the priests were unable to visit their shrines without danger. The idol of *Talatumsi*, used in the New-fire ceremony, was removed from its shrine north of Wala on that account.

[3] Later, as the outcome of a petty quarrel near the middle of the eighteenth century, the *Asa* women moved to Sitcomovi which they founded. At present there is only one woman of this clan in Walpi, and no women of the *Honani*, both of which clans are strong in Sitcomovi.

In view of the tenacity with which the women of Hano have clung to their language, even when married to Hopi men, it seems strange that the *Asa* lost their native dialect during the short time they lived in Tsegi canyon; but the *Asa* men may have married Navaho women, and the Tanoan tongues become lost in that way, the *Asa* women being in the minority. There is such uniformity in all the legends that the *Asa* were Tanoan people, that we can hardly doubt their truth, whatever explanation may be given of how the *Asa* lost their former idiom.

In 1782 Morfi described Hano,[1] under the name "Tanos," as a pueblo of one hundred and ten families, with a central plaza and streets. He noted the difference of idiom between it and Walpi. If Morfi's census be correct, the pueblo has diminished in population since his time. Since 1782 Hano has probably never been deserted, although its population has several times been considerably reduced by epidemics.

In return for their aid in driving the Ute warriors from the country, the Hopi chief gave the Tewa all the land in the two valleys on each side of the mesa, north and east of a line drawn at right angles to *Wala*, the Gap. This line of demarcation is recognized by the Tewa, although some of them claim that the Hopi have land-holdings in their territory. The line of division is carefully observed in the building of new houses in the foothills, for the Hopi families build west of the line, the Tewa people east of it.

Differences in Social Customs

A casual visitor to the East Mesa would not notice any difference between the people of Hano and those of Walpi, and in fact many Walpi men have married Tanoan women and live in their village. The difference of idiom, however, is immediately noticeable, and seems destined to persist. Almost every inhabitant of Hano speaks Hopi, but no Hopi speaks or understands Tewa.

[1] Ten Broeck in 1852 seems to have been the first writer to adopt the true name, Hano, of the Tewa pueblo on the East Mesa.

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While there are Tewa men from Hano in several of the Hopi villages, where they have families, no Tewa woman lives in Walpi. This is of course due to the fact that the matriarchal system exists, and that a girl on marrying lives with her mother or with her clan, while a newly married man goes to the home of his wife's clan to live.

There are differences in marriage and mortuary customs, in the way the women wear their hair,[1] and in other minor matters, but at present the great difference between the Hopi and the Tewa is in their religious ceremonials, which, next to language, are the most persistent features of their tribal life. Hano has a very limited ritual; it celebrates in August a peculiar rite known as *Sumykoli*, or the sun prayer-stick making, as well as the *Tûñtai* midwinter ceremony, the altars of which are described herein. There are also many *katcina* dances which are not different from those performed at Walpi. One group of clown priests, called *Paiakyamû*, is characteristic of Hano. Compared with the elaborate ritual of the Hopi pueblo, that of Hano is poor; but Tewa men are members of most of the religious societies of Walpi, and some of the women take part in the basket dance (*Lalakonti*) and *Mamzrauti*, in that village.

The following Tewa names for months are current at Hano:

January, *Elo-p'o*, "Wooden-cup moon"; refers to the cups, made of wood, used by the *Tcukuwympkiyas* in a ceremonial game.

February, *Káuton-p'o*, "Singing moon."

[1] One of the differences in custom between Hopi and Tewa women is the method of making their coiffures. Unmarried girls of Walpi and Hano dress their hair in the same manner, with whorls above the ears. Married women have different ways of wearing their hair in the two pueblos. During the wedding ceremonies at Hano the mother of the bride, in the presence of guests, combs her daughter's hair, or that part of it on the front of the scalp, over the face, so that it hangs down like a veil. She ties the hair on the back of the head in two coils, one of which hangs on either side, but the hair before the face she cuts on a level with the chin, beginning at the top of the ears. The hair which remains is too short to be done up in coils, and is simply brushed to one side or the other. Among Hopi married women all the hair is included in the two coils, and the "bang" is absent.

March, *Yopobi-p'o*, "Cactus-flower moon." The element *pobi*,[1] which is so often used in proper names among the Tewa, means flower.

April, *Púñka-p'o*, "Windbreak moon."

May, *Señko-p'o*, "To-plant-secretly moon." This refers to the planting of sweet corn in nooks and crevices, where children may not see it, for the *Nimán-katcina*.

June-October, nameless moons, or the same names as the five winter moons.

November, *Céñi-p'o*,[2] "Horn moon," possibly referring to the *Aaltû* of the New-Fire ceremony.

December, *Túñtai-p'o*, "Winter-solstice moon."

Contemporary Ceremonies

The Winter Solstice ceremony is celebrated in Walpi, Sitcomovi, and Hano, by clans, all the men gathering in the kivas of their respective pueblos. The *Soyaluña* is thus a synchronous gathering of all the families who bring their fetishes to the places where they assemble. The kivas or rooms in which they meet, and the clans which assemble therein, are as follows:

Walpi

Moñkiva: *Patki*, Water-house; *Tabo*, rabbit; *Kükütce*, Lizard; *Tuwa*, Sand; *Lenya*, Flute; *Piba*, Tobacco; and *Katcina*.

Wikwaliobikiva: *Asa*.

Nacabkiva: *Kokop*, Firewood; *Tcüa*, Snake.

Alkiva: *Ala*, Horn.

Tcivatokiva: *Pakab*, Reed; *Honau*, Bear.

Sitcomovi

First Kiva: *Patki*, Water-house; Honani, Badger.

Second Kiva: *Asa*.

[1] The names of many Tewa women end in *pobi*, corresponding with the Hopi *si*, a contracted form of *sihû*, in women's names, as Hoñsi, Nasiumsi, etc.

[2] Among the Hopi the moon (Tewa *p'o*) is called *müiyaûh*; new moon, *müiyakatci*; first quarter, *müiyachaunacapti*; full moon, *müiyanacapti*. An eclipse of the moon is spoken of as *müiyaûh moki*, "dead moon." There was a total eclipse of the moon visible at Walpi near the end of December, 1898, when the full moon arose partially obscured. This, said Sikyatala, was bad for the Americans who dwell in the far east, but not for the Hopi. A "dead moon," when in the meridian of the Hopi pueblos, is considered *kalolamai*, "bad."

Hano

MOÑKIVA: *Sa*, Tobacco; *Ke*, Bear; *Kolon*, Corn, etc.
TEWAKIVA: *Nañ*, Sand; *Okuwuñ*, Rain-cloud, etc.

The altars or fetishes in the five Walpi kivas are as follows:

The altar described in a former publication[1] is the most elaborate of all the Winter Solstice fetishes at Walpi, and belongs to the *Patki* and related clans.

The *Asa* family in the *Wikwaliobikiva* had no altar, but the following fetishes: (1) An ancient mask resembling that of *Natacka* and called *tcakwaina*,[2] attached to which is a wooden crook and a rattle; (2) an ancient bandoleer (*tozriki*); and (3) several stone images of animals. The shield which the *Asa* carried before the *Moñkiva* altar had a star painted upon it.

The *Kokop* and *Tcüa* families, in the *Nacabkiva*, had no altar, but on the floor of the kiva there was a stone image which was said to have come from the ancient pueblo of Sikyatki, a former village of the *Kokop* people.

There was no altar in the *Alkiva*, but the *Ala* (Horn) clan which met there had a stone image of Püükoñhoya, and on the shield which they used in the *Moñkiva* there was a picture of Alosaka.

The *Pakab*[3] (Reed or Arrow) people had an altar in the *Tcivatokiva* where Pautiwa presided with the *típoni* or palladium of that family.

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[1] *The Winter Solstice Ceremony at Walpi*, op. cit.

[2] The *Asa* people are also called the *Tcakwaina* clans. The ruins of their old village, near the western point of Awatobi mesa, are called Tcakwaina-ki. Its walls do not appear above the surface.

[3] The particular ceremony of the *Pakab* peoples is the *Momtcita*, a single day's rite which occurs just after the *Soyaluña*, under direction of Pautiwa. Connected with this ceremony are the performances of the "stick swallowers" or *Nocoto* priests who were thought to be extinct at Walpi, but Eewa is chief of the *Nocotana* priests, and the society includes Wikyatiwa, Talahoya, Sikyaventima, and others. They still practice stick-swallowing. Pautiwa is chief of the *Kalektaka*, a warrior priesthood. He belongs to the Eagle clan of the *Pakab* phratry, which may be related to the *Awata* or Bow clan of the former pueblo of Awatobi.

The writer was unable to examine the fetishes of the *Honani* and *Asa* clans, who met in the two Sitcomovi kivas. It was reported that they have no altars in the *Soyaluña*, but a study of their fetishes will shed important light on the nature of the rites introduced into Tusayan by these clans. Tcoshoniwa is chief in one of these kivas.[1]

Pocine, chief of the *Tewakiva*, belongs to the *Nañ-towa*, or Sand clan, and is the elder son of Pocilipobi. Puñsauwi, his uncle, is Pocilipobi's brother. As the *kimoñwi* or village chief of the Tewa colonists, when they came into Tusayan, belonged to the Sand clan, we may suppose this altar to be hereditary in this family.

Anote, the chief of the *Moñkiva* of Hano, is the oldest man of the *Sa-towa* or Tobacco clan. Satele, who assisted him in making the altar, is a member of the *Ke* or Bear clan. Patuñtupi, who was present when the altar was made at Hano, belongs to the *Kolon* or Corn clan.

The Winter Solstice Ceremony

The *Tûñtai* or *Soyaluña* ceremony of the East Mesa in 1898 extended from December 9th to the 19th inclusive, and the days were designated as follows:

9th, *Tcotcoñyuñya* (*Tcotcoñya*), Smoke assembly.
10th, *Tceele tcalauûh*, Announcement.
11th, *Cüs-tala*, First day.
12th, *Lüc-tala*, Second day.
13th, *Paic-tala*, Third day.
14th, *Yuñya*, Assemblage.
15th, *Sockahimû*.

[1] Tcoshoniwa is generally called by a nickname, Tcino, "Bald-head," or "Curly-hair," a sobriquet to which he strongly objects. He is one of the oldest men of Sitcomovi, belongs to the *Patki* clan, and was formerly the *kimoñwi* or governor of Sitcomovi. Hani, of the *Piba* (Tobacco) clan, is political chief of Walpi; and Anote, also of the *Piba* clan, is chief of Hano. All the pueblos have *kimoñwis* or governors, and the office dates from early times; but these pueblo chiefs have no authority over pueblos other than their own.

16th, *Komoktotokya.*
17th, *Totokya, Totokpee.*
18th, *Pegumnove.*
19th, *Navotcine.*

The active secret ceremonies began on the 14th and extended to the 19th. *Yuñya* was the day on which the Walpi chiefs entered their kivas, and *Totokya* that on which the most important secret rites were performed.

Tcotcoñyuñya, Smoke assembly. The time of the Soyaluña is fixed by Kwatcakwa, Sun-priest of the *Patki* clan, who determines the winter solstice by means of observations of sunset on the horizon, as elsewhere described. The Smoke assemblage at Walpi occurred after sunset on December 9th, in the house of Anwuci's wife, adjoining the *Moñkiva*, and was attended by Supela, Kwatcakwa, Sakwistiwa, Kwaa, and Anawita, all chiefs belonging to the *Patki* clan. The Smoke assemblage at Hano, preliminary to the *Tûñtai*, was also held after sunset on December 9th, and was attended by the following chiefs: Anote (Temĕ), *Sa-towa;* Satele, *Ke-towa;* Pocine (Koye), *Nañ-towa;* Patuñtupi, *Kolon-towa.*

There was no formal notification of *Tûñtai* from the housetops of Hano on the following morning, the *Soyaluña* announcement from Walpi serving all three pueblos on the East Mesa.

The formal announcement was made by Kopeli at daybreak of December 10th. Hoñyi, the regular *tcakmoñwi*, or town-crier, was snowbound at Keam's Canyon, and consequently was unable to perform this function.

The Smoke assemblage and its formal announcement at daybreak on the following morning have been observed in the Snake dance, and in the Flute, New-fire, and *Soyaluña* ceremonies; it probably occurs also in the *Lalakoñti* and *Mamzrauti.* It takes place several days before the Assembly day, when the chief enters the kiva and sets his *natci* or standard on the kiva hatch to announce that he has begun the ceremonies.

XUM

Drawn by MARY M. LEIGHTER

ALTAR IN THE MOÑKIVA AT HANO

Kivas at Hano

There are two kivas in Hano, one of which, called *Tewakiva*, is situated at the head of the trail to the pueblo. The other, called the *Moñkiva*, is built in the eastern part of the plaza, and, as its name implies, is the "chief" Hano kiva. Both these semi-subterranean rooms are rectangular[1] in shape, and in structural details resemble the kivas of Walpi. Each has a hatchway entrance in the middle of the roof, and is entered by means of a ladder which rests on the floor near a central fireplace. Neither of the Hano kivas has a window, but each has a raised platform for spectators east of the fireplace.[2]

Altar in the Moñkiva at Hano

Anote,[3] the chief of the *Moñkiva*, constructed his altar (plate XVIII) on the day above mentioned as *Paictala*. He anticipated the others in making it, and began operations, about 10 A.M., by carefully sweeping the floor. His fetishes and other altar paraphernalia were in a bag on the floor at the western end of his kiva, but there was no *típoni*, or chieftain's badge, even on the completed altar.

Shortly after Anote had finished sweeping the floor of the kiva, Satele entered, followed a few minutes later by Patuñtupi.[4] These three men, with Kalakwai, who was weaving a blanket, were the only persons in the kiva while the altar was being made. Immediately after the other chiefs came in, Anote began the making of prayer-sticks. Four of these were made, each of characteristic Tewa form.

Each of these prayer-sticks was double the length of the

[1] The orientation of the Hano kivas is not far from that of the other East Mesa kivas, or about north 44° west.

[2] The chief kiva had a small stove, an innovation which was greatly appreciated by the writer.

[3] So named by the Hopi; the Tewa call him Temĕ. At Hano almost everyone has a Hopi and a Tewa name.

[4] Son of Kutcve and Kotcampa of the *Kolon-towa*, or Corn clan; commonly called "Esquash" by Americans.

ALTAR IN THE MOÑKIVA AT HANO

Drawn by MARY M. LEIGHTER

middle finger, and was painted black with green pigment at the blunt end. On one of the two sticks which compose this prayer offering, there was cut a facet which was painted green with black dots representing eyes and mouth. The stick without the facet was called the male, and upon it a ferrule was incised.

The two sticks were bound together with two cotton strings in two places, but no packet of prayer-meal was appended as in Hopi prayer-sticks (*pahos*).[1] A string with a terminal feather was attached to that which bound the two sticks together. Anote likewise made many feathered strings called *nakwakwocis*, and Satele fashioned two prayer-sticks; all of these were laid in a basket-tray on the floor.

After these prayer offerings had been completed, Anote placed on the floor a blanketful of moist clay which he further moistened and kneaded, fashioning a part of it into a cylinder about a foot and a half long, and two inches in diameter. This object was made blunt at one end and pointed at the other. The image represents *Avaiyo*, the Tewa name of *Palülükoñ*, the Great Serpent. He added to the blunt end, or head, a small clay horn,[2] and inserted a minute feather in the tip of the tail. He fashioned into a ball the clay that remained after making the effigy of the serpent, patting it into a spherical compact mass about the size of a baseball. This, called the *natci*, later served as the pedestal to hold two eagle-wing feathers, and was placed at the kiva hatch each day to inform the uninitiated that ceremonies were in progress.

Having finished the effigy of the Great Serpent and formed the clay cylinder to his liking, Anote made on the western side of the floor of the kiva a ridge of sand, a few inches high and about

[1] The corn-husk packet of meal seems to be wanting in Zuñian, Keresan, and Tanoan prayer-sticks, but it is almost universally present in those of the Hopi. The Tanoan prayer-stick is called *o'dope*.

[2] A cephalic horn is an essential organ of the Great Snake, and is always represented in pictography and on graven or other images of this being. Note the similarity of his Tewa name to the Spanish word *abajo*, "below."

two feet long, parallel with the western wall. While making this ridge he sat between it and the kiva wall. Having patted this sand ridge to the proper height, he removed from their wrapping of coarse cloth, four sticks, each about two feet long. These sticks, dingy with age, were tied in pairs, and were called *poñya-saka*, "altar ladders." They were inserted in the ridge in pairs, one on each side, and between them was placed in the sand a row of eagle feathers. As these were being put in position by Satele, Anote sang in a low tone, the song continuing as the other parts of the altar were arranged.[1] Anote was frequently obliged to prompt his associate regarding the proper arrangement of the objects on the altar.

Satele next drew a line of prayer-meal before the ridge of sand, and from it, as a base line, made three deep semicircles representing rain-clouds. These were drawn as simple, elongated outlines, but immediately the chief sprinkled meal on the floor over the space enclosed by them. The curved edges of the three rain-cloud symbols were then rimmed with black sand or powdered coal. About twenty short, parallel lines, representing falling rain, were next drawn on the floor with cornmeal, and alternating with them the same number of black lines. Satele then placed upon the rain-cloud symbols, skeleton puma paws, two for each rain-cloud. At the apex of each symbolic cloud a stone fetish of a bear was deposited, and by the side of each an arrow-point or other stone object was laid.

The clay effigy of the Great Snake was next placed back of the rain-cloud symbols, with the head pointing southward. As this effigy lay on the floor, Anote made on it, with meal, representations of eyes and teeth, then drew two lines of meal about the neck for a necklace, and two other parallel lines about the tail. Black powder was then evenly sprinkled along the back of the effigy.

[1] This is the first time songs have been noted while an altar was being put in place.

Both Anote and Satele procured a few ears of differently colored corn and shelled them upon the rain-cloud picture, sprinkling the grains evenly over the meal design, and adding a few to the back of the Great Snake. Squash and melon seeds were likewise distributed in the same way. The vase from which the stone effigies and other images were taken was then placed near the base of the middle rain-cloud picture, and a large quartz crystal was added on the left. A conch, which the author presented to the chief, was placed on the right of this vase. Anote then swept the floor north of the fireplace, and as he sang in a low tone Satele drew a straight line of meal from near the right pole of the ladder across the floor to the middle of the altar. He placed along this line, at intervals, four feathers, and near where it joined the altar he stretched a string, with an attached feather, called the *pütabi.*[1] He then sprinkled a line of pollen along this trail of meal.

Anote's medicine-bowl was set just in front of the middle rain-cloud figure; the clay pedestal with inserted upright feathers stood before the left, and a basket-tray with prayer-meal before the right rain-cloud figure.

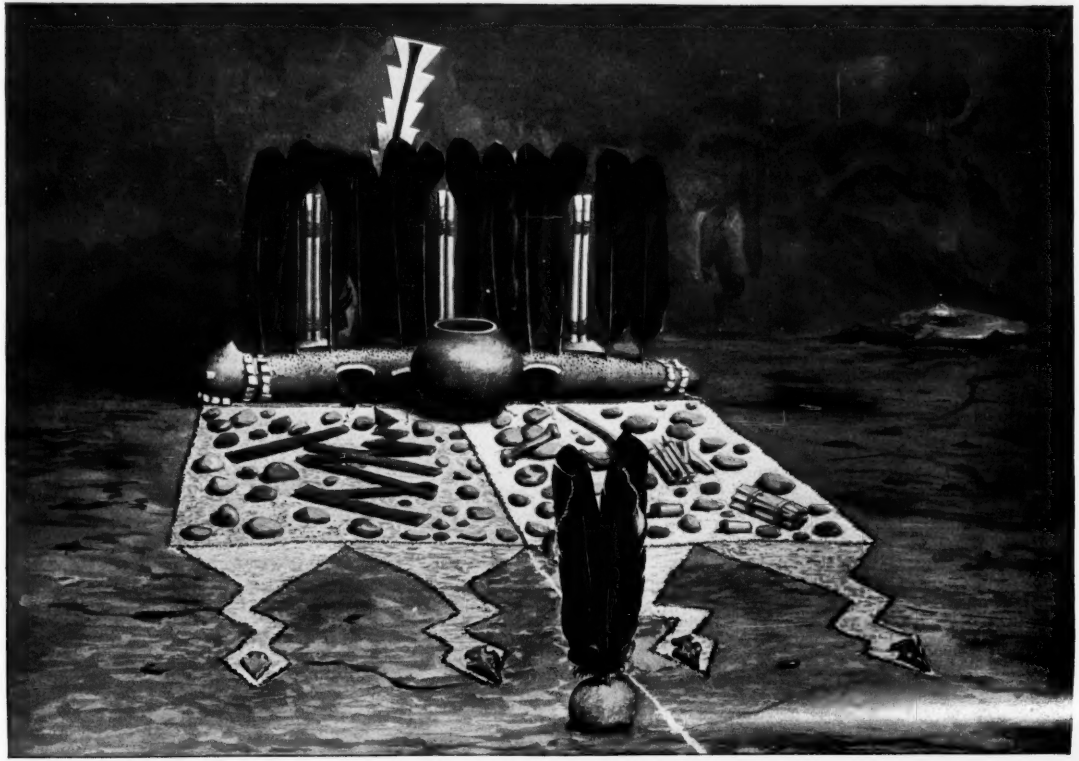
Altar in the Tewakiva at Hano

The altar (plate XIX) in the *Tewakiva* was begun about 10 A.M. on the Assembly day, and was made by Pocine,[2] assisted by his uncle, Puñsauwi, both members of the *Nañ-towa,* or Sand clan.

The preparations began with the manufacture of a clay effigy of the Great Snake similar to but larger than that made by Anote in the *Moñkiva.* The clay was moistened and kneaded on the floor, and then rolled into a cylinder about three feet long, blunt at one end and pointed at the other.

[1] This was a four-stranded string of cotton, as long as the outstretched arm, measured from over the heart to the tip of the longest finger. It is supposed to be a roadway of blessings, and the trail of meal is the pathway along which, in their belief, the benign influences of the altar pass from it to the kiva entrance and to the pueblo.

[2] Pocine is a youth not far from seventeen years of age. His marriage ceremony was studied by the writer a week before the *Tüñtai.*



Drawn by MARY M. LEIGHTER

ALTAR IN THE TEWAKIVA AT HANO

Four clay balls were made at the same time. One of these later served as the base of a standard (*natci*) which was subsequently placed each morning on the kiva hatch to warn the uninitiated not to enter. The other three were placed back of the altar and supported the sticks called the altar-ladders, which will be considered later.

Pocine outlined with meal on the floor a square figure which he divided into two rectangular parts by a line parallel with the northern side. He used meal of two colors—white for one rectangle, and light brown or pinkish for the other. Having made the outlines of the rectangle with great care, he carelessly sprinkled the enclosed spaces with the meal, hardly covering the sand base upon which the figures were drawn. He then added four triangular figures in meal on the south or front side of the rectangular symbols. These images represented rain-clouds, and were alternately white and brown.[1] To the tips of these triangular rain-cloud figures he appended zigzag continuations with lozenge-shaped tips representing the lightning of the four cardinal points. A stone spearpoint or arrowhead was laid on each lozenge-like tip of the zigzag lightning.[2]

The two men, Pocine and Puñsauwi, next raised the snake effigy and bore it to a position back of the rectangular meal figures on the floor. They deposited it in such a way that its head pointed southward. Having set the snake effigy in the position which it was to retain throughout the ceremony, Pocine sprinkled a black powder along the back of the image, while his uncle inserted several kernels of corn in the blunt end to repre-

[1] The triangle among the Hopi is almost as common a symbol of the rain-cloud as the semicircle. It is a very old symbol, and is frequently found with the same meaning in cliff-houses and in ancient pictography.

[2] It was found in studying the four lightning symbols on this Tewa altar that sex is associated with cardinal points as in the Walpi Antelope altar. The lightning of the north is male, that of the west female, the south male, and the east female. The same holds with many objects in Ḥopi altars; thus the stone objects, *tcamahia*, of the Antelope altar follow this rule. In the same way plants and herbs have sex (not in the Linnean meaning), and are likewise associated with the cardinal points.

ALTAR IN THE TEWAKIVA AT HANO

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sent the teeth of an upper jaw. Two kernels of corn were then stuck into the head to indicate eyes, and an imitation necklace, also of grains of corn, was made around the neck of the idol. A double encircling row of corn grains was inserted in the tail or pointed end of the effigy, and Pocine added a small feather at the tip.

After the effigy had been put in position and adorned in the manner described, both Pocine and his uncle again shelled ears of corn on the rectangles of meal,[1] to which were added squash, melon, and other seeds. These were regularly distributed, some being dropped along the back of the image.

A row of eagle feathers was now inserted along the back of the effigy, instead of in a ridge of sand as in the *Moñkiva* altar. There were twelve of these feathers, and they were placed at equal intervals from the neck to the tail of the effigy. Puñsauwi then placed the three balls of clay, previously mentioned, back of the image, and in each of these balls he inserted two sticks, called *pahos*, similar to those used on the altar of the *Moñkiva*. These are ancient objects, being reputed to have descended from a remote past. One stick in each pair was called the male, the other the female, as is true of all double prayer-sticks used by the Hopi Indians. They are called *poñya-saka*, "altar-ladders," and imitations[2] of them in miniature are made and placed in shrines on the final day of the ceremony.

The insertion of the row of eagle-feathers along the back of the clay effigy of the serpent recalls an instructive reptilian figure on one of the bowls from Sikyatki.[3] In this ancient pictograph we find a row of triangles drawn along the medial line from the head to the tail of a lizard-like figure. The use of the triangle in ancient Pueblo pictography as a symbol of a wing-

[1] This sprinkling of corn seeds upon the meal picture of a Hopi altar is mentioned in an account of the Oraibi Flute ceremony. The evident purpose of this act is to vitalize the seeds by the accompanying rites about the altar.

[2] Called *omowûh-saka*, "rain-cloud ladders."

[3] *Smithsonian Report*, 1895, pl. lvii.

feather, has been pointed out in an article on the feather as a decorative design in ancient Hopi pottery.[1] The medial line of triangles, representing feathers, on the Sikyatki food-bowl, is paralleled in the Hano kiva by eagle-wing feathers inserted along the middle of the image of a snake.

A small vase was next placed just in advance of the effigy of the Great Snake, and into this vase Pocine poured water from an earthenware canteen, making a pass as he did so to the four Pueblo cardinal points—north, west, south, and east—in sinistral ceremonial circuit.[2] A stone arrowpoint was then laid on the lozenge-shaped extremity of each lightning figure.

Pocine now scraped into the vase some powder from a soft white stone, saying, as he did so, that the process was called *sowiyauma*, "rabbits emerge,"[3] and that he wished he had stones of other colors, corresponding to the cardinal points, for the same purpose. After this was finished he emptied on the floor, from a cloth bag, a miscellaneous collection of botryoidal stones (many of which were waterworn), a few fetishes, and other objects, one of the most conspicuous among the latter being a large green stone. All were at first distributed on the meal picture without any special order, but later were given a definite arrangement.

Pocine next went up the kiva ladder, and standing on the upper rung in the sunlight, sought, by means of an angular piece of glass, to reflect a ray of sunlight on the altar, but more especially into the vase of medicine. Four turkey-feathers were then inserted at equal intervals along the base of the serpent effigy, as shown in plate XIX.

[1] *The American Anthropologist*, vol. XI, page 1.

[2] The Tewa, like the Hopi, recognize six ceremonial directions—north, west, south, east, above, and below. The sinistral circuit is one in which the center is on the left hand, while the dextral circuit has its center to the right. The older term, "sunwise," for the latter circuit, etymologically means one ceremonial circuit in the northern hemisphere and an opposite in the southern. On this and other accounts the author has ceased to use it in designating circuits.

[3] For the increase of rabbits.

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After the stone objects had been arranged on the meal picture, a line of meal was drawn along the floor, from the right pole of the ladder to the altar. This line was drawn with great care, particular pains being taken to make it as straight as possible. There was no singing while this occurred, thus differing from the ceremony performed in the other Hano kiva. Four small feathers were placed at intervals along the line of meal. These, in sequence, beginning with the one nearest the ladder, were *sikyatci*, yellow-bird ; *kwahu*, eagle or hawk ; *koyoña*, turkey ; and *pociwû*. Pocine sprinkled pollen along this line or meal trail.

There was then emptied from a canvas bag upon the rectangular meal figures a heterogeneous collection of objects, among which may be mentioned a bundle of gaming reeds, the humerus of a turkey, a whistle made of a turkey bone, and a zigzag wooden framework such as is used by the Hopi to represent lightning.[1]

Back of the altar, leaning against the wall of the kiva, was set upright a wooden slat, notched on both edges and called *tawa-saka*, "sun-ladder." Miniature imitations (plate XX) of this are made in this kiva on the last day of the *Tûñtai* and deposited in a shrine near Sikyaowatcomo, the site of the early settlement of the Tewa. The *poñya-saka* or *tawa-saka* mentioned has not before been seen in any Hopi ceremony, and it may be characteristic of Tewa altars. A notched prayer-stick, called the rain-cloud ladder, is placed in the same shrine at this time. This is characteristic of the Tewa of Tusayan, but is not found in the Hopi *pahos*, with which I am familiar.[2]

[1] This zigzag framework had appended to one end a carved imitation of a snake's head, and as it represents the lightning this association was not incongruous. Similar frameworks are carried in the dance by a man impersonating Püükoñ, the War god, and at certain other times when lightning is symbolized.

[2] In asking why albino Hopi are found at the Middle Mesa and not on the East Mesa, it was unexpectedly learned that in some ceremonies a white prayer-stick is made at the former mesa, and that albinism was due to want of care by the father in making these offerings while his wife was pregnant. The author has never seen the white *paho* of the Middle Mesa, and does not know when it is made nor its shape and use.

Drawn by J. L. RIDGWAY

MINIATURE IMITATION OF THE TAWA-SAKA OR SUN-LADDER

(About one-half size)

The reason these prayer-sticks are termed "ladders" is because they have the form of an ancient type of ladder made by notching a log of wood. They are symbols of the ladders by which the Sun is supposed to emerge from his house at sunrise. In the Hopi and Tewa conception the Sun is weary as he withdraws to the south in winter, and these ladders are made to aid him in rising, and thus in returning to bless them. More light will doubtless be shed on the significance of the sun-ladder prayer-offerings when we know more of the ceremonies about the *Tûñtai* altars.

No *típoni* or badge of office was placed on this altar on the day it was made, and my abrupt departure from the East Mesa made it impossible for me to see the rites which are later performed about it.

It is evident, from the preceding description, that the priests of Hano have a knowledge of the Great Serpent cult corresponding to the worship of Palülükoñ. Among the Hopi the *Patki* people claim to have introduced this cult[1] in comparatively recent times. There is a Tewa clan called *Okuwuñ* (Cloud) which corresponds, so far as meaning goes, with the *Patki* clan of the Hopi. Whether this clan brought with it a knowledge of the Great Snake is not clear, as traditions are silent on that point.

There is a tradition in the *Okuwuñ* clan that their ancestors, like those of the *Patki*, came from the south, and that the *Nañ-towa* bears a like relationship to the *Okuwuñ* that the Hopi *Tuwa* clan does to the *Patki*.[2] If this tradition is well founded, a knowledge of the Great Snake fetish of the two Hano kivas may have been brought by the *Okuwuñ* and *Nañ-towa* into Tusayan from the same place as that of Palülükoñ.

[1] All Hopi priests are very solicitous that sketches of the *Patki* altar in the *Soyaluña* should not be shown to Tewa men or women, and the Tewa men begged me to keep silent regarding their altars while conversing with the Walpi chiefs. There is a very strict taboo between the two peoples at the time of the Winter Solstice ceremony, which is more rigid than at other times.

[2] The *Tuwa* (Sand) or *Kükütci* (Lizard) clan lived at Pakatcomo with the *Patki* people, according to their legends.

The Kwakwantu society of the *Patki* clans among the Hopi are intimately connected with this Great Plumed or Horned Snake cult. In some parts of the New-fire ceremony, in which this society takes a prominent part, each member of the society carries in his hand a small wooden image of a horned snake. These images are called *moñkohus*, some of the typical forms of which are figured in an article on the *Naacnaiya*.[1] The head of the snake and its horn are well represented in several of these wooden effigies.

Conclusions

The special interest attached to the Winter Solstice altars at Hano is in the fact that they are made by Tewa priests whose ancestors came to Tusayan about the beginning of the eighteenth century. The makers claim that their forefathers brought a knowledge of them from Tcewadi, in the upper valley of the Rio Grande in New Mexico, and that their relatives in the Tewa pueblos in the east still use like altars in their celebration at the *Tûñtai*.

Nothing, so far as known, has yet been published on the *Tûñtai* altars of the eastern Tanoan people, but ethnographers may yet find in the kivas of those villages material which will render the above descriptions of comparative interest. The resemblance of the *Tûñtai* altars to that of the *Patki* and related families in the Walpi *Moñkiva* at the Winter Solstice, is a very distant one. Both have snake effigies, but there is practically little else in common between them, or with the altar erected at the same time by the *Pakab* people in the *Tcivatokiva*. The *Tûñtai* altars are characteristically Tewan, and, while homologous with each other, are different from any yet known from the Hopi pueblos.

[1] *Journal of American Folk-lore*, 1892, pl. II, figs. 1–4. These *moñkohus* of the Kwakwantu society, representing horned snakes, should not be confounded with those carried by other societies, typical forms of which are shown in figures 5–8. In the article quoted it was not stated that the effigies with heads represent *Palülükoñs*. The effigy on the massive club borne by the chief of the Kwakwantu also represents the Great Snake.

The purport of the *Tûñtai* rites at Hano seems to be similar to that of the Hopi *Soyaluña*, namely, to draw back the sun in its southern declination, and to fertilize the corn and other seeds and increase all worldly possessions. As at Walpi, strings with attached feathers are made and given to men and women with wishes that the gods may bring them blessings. These strings are also attached to beams of houses, placed in springs of water, tied to the tails of horses, burros, sheep, dogs, chickens, and indeed every possession which the Indian has and wishes to increase. The presence of the idol of the snake means snake worship.

The survival of the Tanoan *Tûñtai* altars at Hano is typical of the way in which the Tusayan ritual has grown to its present complicated form. They are instances of an intrusive element which has not yet been amalgamated, as the knowledge of them is still limited to unassimilated people and clans.

Similar conditions have existed from time to time during the history of the Hopi, when new clans were added to those already existing. For many years incoming clans maintained a strict taboo, and each family held the secrets of its own religion; but as time went on and assimilation resulted by intermarriage, the religious society arose, composed of men and women of different clans. The family to which a majority of the membership belonged continued to hold the chieftaincy, and owned the altar and its paraphernalia, cherishing the legends of the society. But when men of other clans were admitted to membership, a mutual reaction of one society on another naturally resulted. This tended to modifications which have obscured the original character of distinctive family worship.

The problem of the Hopi ritual, by which is meant the sum of all great ceremonies in the Hopi calendar, deals largely with a composite system. It implies, as elsewhere pointed out, an investigation of the characteristic religious observances of several large families which formerly lived apart in different pueblos. It

necessitates a knowledge of the social composition of Walpi and of the history of the different phratries which make up the population of the village.

There is a corollary to the above conclusions. No pueblo in the southwest, outside of Tusayan, has the same ceremonial calendar as Walpi, because the population of none is made up of the same clans united in the same relative proportions. Hence the old remark that what is true of one pueblo is true of all, does not apply to their ritual. Some ceremonies at Jemez, Acoma, Sia, and Zuñi, for instance, are like some ceremonies at Walpi; but the old ceremonial calendar in any one of these pueblos was different from that of the other, because the component families were not the same. In the same way the ceremonies at Hano and Walpi have certain things in common, due no doubt to the assimilation in the latter of certain Tanoan clans, but their calendars are very different. The *Tûñtai* at Hano differs more widely from the Winter Solstice ceremony at Walpi, a gunshot away, than the Walpi observance differs from that at Oraibi, twenty miles distant. So we might also predict that if we knew the character of Winter Solstice altars in the Rio Grande Tewa villages, they would be found to resemble those of Hano more closely than the altars of Hano resemble those of Walpi.

THE NANTICOKE INDIANS OF INDIAN RIVER, DELAWARE

By WILLIAM H. BABCOCK

There are two remnants of Indian population in eastern Delaware, not far from the coast,—the so-called Moors of Kent county and the more southerly Nanticokes on Indian river in Sussex county.

Of the former I can speak by report only, not having visited them. According to an old legend they are the offspring of Moors shipwrecked near Lewes; a more romantic version gives them only one Moorish progenitor—a captive prince who escaped from his floating prison and found wife and home among the half-Indian population alongshore. There are said to be two or three hundred of these people, clustering mainly around Chesholm, a hamlet and railroad station a few miles south of Dover. The *Philadelphia Press* for December 1st, 1895, presents a series of portraits which, if accurate, go far to sustain the contention of the Nanticokes that there is not much in common between the two peoples; but their intercourse is too slight and infrequent for their judgment to be conclusive. They consider the Chesholm people to be a mixture of Delaware Indians with some Moorish or other foreign strain. According to their tradition the Nanticoke and Delaware tribes were often at war in the old time, and even yet there would seem to be a barrier of rather more than indifference between them.

The Nanticokes themselves are not more than fifty or sixty in number at home; that is to say, in the sandy pine-land country which lies between the northeastern shore of Indian river and the coastline, comprising approximately the two county subdivisions

or "hundreds" of Clear spring and Indian river. They have sent out numerous colonies and keep in touch with most of these, so that one may see in their albums prosperous faces from Maine and California. One member of the tribe, lately deceased, attained a considerable measure of wealth in Philadelphia. A whole carload migrated to Michigan a short time before the Rebellion, when circumstances and white neighbors bore over-heavily upon them. Another party, including Levin Sockume, their strongest man, moved to Gloucester, New Jersey. Nearer home, though hardly more accessible, are isolated families on the Pocomoke, near Snow Hill, and across Delaware on the river which bears their own name. These offshoots have for the greater part kept up their rules of life in the matter of racial segregation, except that wherever a single household settled where there were no Indian neighbors, the sons and daughters have generally married with the whites; but where wives and husbands of Nanticoke blood were obtainable, the latter seem to have had the preference.

In the Indian River country, the rule is imperative. There must have been intermarriage with the whites at one time, for they admit that none of them is wholly Indian, while nothing so stirs their indignation as to be suspected of having negro blood; but at present they marry exclusively among themselves. A Nanticoke of either sex who marries among the negroes is referred to as having "gone astray," and although not ill-treated is no longer welcome in church or home or any social gathering. They have their own (Methodist Protestant) church, usually ministered to by a white man, and a school supported wholly by them for their own children only, though they pay taxes abundantly for the public schools besides.

In person they seem to be mainly of medium height and of strong though not very bulky frame. The form of head differs not less than with ourselves, I think, judging solely by the eye. Neither from the individuals before me, nor from the much more

numerous photographs which they exhibited, could I deduce anything like a general rule or type. The craniologist of the future would probably form his idea of the Nanticoke from the particular specimens which might happen to come in his way, and his conclusions would err accordingly.

In complexion there is as marked a variance. There are individuals whiter than many white folk; there are others of all intermediate shades, to the coppery tint which we most often associate with the Indian race. This does not depend on the proportion of Indian blood; the son of a very light-tinted father and mother may be a more pronounced Indian in complexion than half the members of tribal delegations that visit Washington.

My chief informant and kind assistant in my investigations, Mr William Russell Clark, is of notable Nanticoke type—long, glossy, black hair waving about his shoulders; vivid, eager, black eyes; aquiline nose, dark complexion, oval countenance; enterprising, sensitive, spirited, and kindly. But there is another and broader type of countenance among his people which recalls the more Tartar-like and square-faced Indians whom we so often see. In cheek-bones, in lips and nostrils, they have the features of their race, or of the white race, and not those of the African; yet no one of them would be taken for a person of unmixed white blood unless by a careless observer.

I neither saw nor heard of cripples nor seriously diseased persons; yet instances of longevity seemed equally wanting, for their oldest living member is under fourscore years. To divers inquiries concerning young persons or couples, the answer "dead," "he is dead," or "they are both dead," came with depressing regularity. I found that my entertainers agreed with me in not considering themselves a long-lived people.

Children are fairly numerous. I saw no very large families, but the roads were well dotted with them in twos and threes on their way to school. They seemed a hearty, cheery lot of youngsters, not unlike well-treated, well-taught white children of equal

age and rural surroundings. They seemed also in a fair way to keep more than even with the death-rate, while the continual loss by emigration is well offset by the love of this secluded sept of people for the tribal home. The city draws them, or the ends of the country draw them in early life; but with middle age the Indian hundred prevails and they are back in the trials and limitations of their environment. Of course the little community brightens by this outflow and inflow. In that sense there is a growth, but the best available estimate held their numbers to be nearly stationary. In area of occupancy they have perhaps contracted a little since the middle of the century, but I think not at all during the last twenty years.

They have quite lost their language. It is believed by them that Lydia Clark, great-great-grandmother of the gentleman above named, was the last of them who could speak it. To the day of her death she wore an Indian cap and short skirts, altogether refusing the ordinary garb of white women. Every relic of distinctly Nanticoke customs has disappeared as completely.

They have, of course, no tribal organization, but live on such land as they have been able to earn and buy, quite out of sight and reach of the Indian Bureau, with no sort of Governmental aid, and with more hindrance than help from anybody. They pay their taxes and vote like other citizens. For a long time there was a determined effort to crowd them into the ranks of the negroes, when the latter were denied many of the rights of citizenship; but their steady resistance and persistence have triumphed over it, although a certain measure of obstruction, disparagement, and jealousy may still be discovered about them. Their first church was burned down to compel them (as they believe) to worship with the negroes. They built a second, and the latter, they say, got possession of it. Then they built a third, and they assemble in it weekly to this day.

They are a neat people in their persons and homes. Myself

and a companion, with a rain-storm, took one of the latter by surprise, and we could not have been given anywhere a more dainty and tasteful room in which to sleep; it had nothing costly in it, but everything was bright and pretty and perfect. In the four-poster bedstead, the brass stair-rods of the carpeted stairway, no less than in certain slight, winning quaintnesses of speech, there lingered a reminiscence of older fashions and times. There were prayers before breakfast and grace at every meal, for these people are conscientious in religious observance, though in an unostentatious way. No one could have been more cordial in their welcome than this good old couple, and it was to strangers whom they had never seen before.

We visited one Indian mound, which they identified as having that character by continuous tradition, though they could not say who made it nor when. I paced over the crown of it from one point of its circumference to the opposite, and determined that interval to be approximately forty-eight yards. It seems to be settling in height and probably spreading. The elder Mr Clark said it had lost two feet in elevation within his memory; perhaps the sandiness of the soil may account for such subsidence. It is nearly as white as snow in parts of the field near by. Such a mound could have little more consistency than a sand-dune by the seashore, except where the roots of saplings and herbage have bound the shell of it together. There is a light growth of new timber over it, besides one large oak near the periphery, which, however, may be beyond the limit of the original mound. The present height seems not over fifteen feet, so that it is a very low and squat conoid. They told me of another tumulus, at a tributary of Indian river, known as Swan creek, where are also said to be the remains of a dam or some similar work.

The only distinctive thing that I observed in their architecture was a house with bright blue posts and corners, all the rest being white or nearly colorless. The effect was gay and primitive, not to say a little amusing.

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I visited one Indian home where could be counted nineteen outbuildings of various size, including long rows of overflowing cornhouses, ample, well-stored barns, and all else that went to make up abundant evidence of thrift. The farmer who owned this place began with nothing; now he is able to give one of his sons a two-hundred-acre farm, keeps two sawmills in operation, maintains his fields and cattle in excellent order, and is popularly credited by the whites with being the richest man in that region. I heard his possessions estimated at $60,000, which stands for more in southeastern Delaware between Cypress swamp and the ocean than a much larger amount in one of our great cities. The money had been made fairly by diligent labor, enterprise, and a vigilant eye to the main chance. "A man of good judgment and mother wit" are the terms in which he was defined to me by an Indian neighbor, relative, and friend.

These interesting people should not be neglected any longer. They ask no help, being very well able to take care of themselves, except that in the matter of school facilities the state of Delaware might go a little out of its way in their behalf. There would be no loss, but some fairness, in letting their taxes support their own schools. But the anthropologic world may brighten matters a little for them by showing that in their long struggle for individual existence they have at last become visible to the scientific eye. Certainly they have a nearly unique interest, sharing the position of the Pitcairn islanders as instances of successful modern hybridization of two widely different human-race stocks, the resultant type, when established, preserving itself wilfully from further intermixture or change.

I have called these people Indians, and certainly their dominant tone of feeling and the more obvious characteristics of some of their race warrant the name; but it is evident, also, that they have nearly as many white attributes of mind and body, habit and temper. The result is a singularly alert, versatile, capable kind of men, with no present sign of vanishing from among us.

SOCIAL ANTHROPOLOGY—A REVIEW

By ACHILLE LORIA

(Translated from the Italian by Robert Stein)

For some time there has been rising and assuming considerable proportions, a school of sociology that attempts to confront current doctrines (which in its opinion are baseless) with new and altogether different doctrines founded on the firm basis of biologic and anthropologic science. This new school, or new science if you will, has been called by its creators Anthropo-sociology, or Social Anthropology, and it is already promulgated by numerous champions, among whom Lapouge in France and Ammon in Germany occupy positions of special prominence. In reality the objects set forth by these writers are far from being as original and unheard-of as they seem to believe, since it would not be difficult to demonstrate that they were in large measure anticipated by the theorists of the so-called Social Darwinism. Still, it cannot be denied that the teachings of the new school have been set forth by the writers mentioned in a sufficiently forcible form to impress the half-learned and even the learned, and to enlist believers in the new dogma. Now, in view of the inroads of this school and its growing influence, it seems timely here to subject its main doctrines to a brief examination; and this object will be attained by reviewing Otto Ammon's work, *Die Gesellschaftsordnung und ihre natürlichen Grundlagen* (The Social Order and its Natural Foundations), which has already been honored by a second edition, and has created a stir in the intellectual circles of Germany.

Sociology, says Ammon, must be based on anthropology, since man is the cell of the social organism, and one can have no knowledge of an organism except through a careful analysis of

the cells of which it is composed. Now, whoever applies to sociology the results of biologic and anthropologic science, as reorganized by Darwin, must necessarily consider the social aggregate as an eminently utilitarian institution, intended to secure the welfare and defense of the individual against untoward influences from without. Hence, of two species, one of which is socially organized and the other not, the former has a much greater chance of winning in the struggle for existence; hence, also, in the course of time only the socially organized species survive, while the others, by a fatal law, perish; in this way social organization becomes the universal law of beings. But while in the lower species the social organization is limited to a simple mechanical aggregation of undifferentiated individuals, and while in the somewhat higher species this is complicated by a certain differentiation of functions, in the highest species, man, society presents a most pronounced differentiation of functions and individuals, inasmuch as, through a wise division of occupations, society in the end assigns to each individual that special function to which he is best adapted—it puts the right man in the right place.

When one considers a great number of individuals from the point of view of intellectual capacity, he will presently discover that they are arranged according to the well-known binomial law —those of the highest intellect, the geniuses, are few in number; those between genius and medium intelligence are in greater number; those of medium intelligence comprise the largest number of individuals; those whose intelligence is less than medium are the fewer in number the lower their intellectual level; finally, the lowest grade, the cretins, are about equal in number to the geniuses. Now, human society cannot progress, cannot triumph in the conflict with rival societies and with nature, unless the function and social position of each of its members be adapted to his intellectual status; hence a sound social organization requires that the best positions be assigned to the best men and the inferior positions to inferior men; while of course it is highly

desirable that the number of the best shall increase to the utmost.

Luckily, human society, through a wonderful and unconscious tendency, has for centuries obeyed precisely this law of equilibrium and of progress. In fact, in human society it is the best, the worthiest, who win the highest positions, who reach the summit of wealth and power; the insignificant, the mediocrities, go to form the impecunious and laboring class, while the degenerate, the spiritless, and the silly furnish the contingent of the great army of prostitution, pauperism, and crime. Hence, to increase, so far as possible, the number of superior intellects, and to elevate their mental power, the segregation of the highest classes—their crystallization into privileged castes inaccessible to lower circles—is an admirable device, inasmuch as by it the individuals of those classes are rigorously obliged to unite in marriage only with individuals of their own class. In fact, a law that would guard against the marriage of individuals possessing superior qualities with those who lack them, would result in the avoidance of *panmixia* (as Weissmann would say), or that intercrossing of individuals gifted and not gifted with useful qualities, which leads to the fatal disappearance of those qualities in future generations and thus to the irreparable deterioration of the species. Therefore, it is highly desirable, in the interest of the human race, that the wealthier and more cultured classes should persist in their aristocratic exclusiveness to which they are already inclined, and should zealously practice Horace's precept, *Odi profanum vulgus et arceo* (I hate the profane crowd and keep them away). The evident proofs, continues Ammon, of the advantages of this method are seen the moment one observes the splendid results attained where the rule is most rigorously applied. As an example he mentions the princely marriages and the robust, intelligent offspring they usually produce.

At this point that invisible reader whom every writer has before him while he writes, will venture to express doubt concerning

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the inevitable attribution of wealth and power to the most intelligent individuals, which, according to Ammon, is and always has been a fact through a sort of providential necessity. Is it quite certain, he will ask, that in the lottery of greatness and fortune the greatest prizes are drawn by the best? Is it true that rich and intelligent, poor and dull, are and always have been synonymous? But these childish doubts, the marks of profound ignorance of anthropologic laws, are received by the author with a smile of superiority. Above all, he says, if we compare the curve of incomes with the curve of geniuses, we find a marvelous correspondence between them—few great geniuses and cretins, and few greatest and least incomes; the greatest number of medium intellects, and the greatest number also of those of medium property; a gradual decrease in the number of those who stand between mediocrity and genius on the one side and cretinism on the other, just as there is a gradual decrease in the number of those whose wealth is between medium and the milliard on one side and the most abject pauperism on the other. Now, this parallelism demonstrates precisely that the individuals who occupy the points on the first curve are the same as those who occupy the corresponding points on the second curve; in other words, it furnishes the irresistible proof of the necessary correlation between the conditions of intelligence and of wealth. Furthermore, there is abundant proof, more direct and convincing, of such correlation. De Candolle showed long ago that the noble and high-placed families of the cities have produced a number of scientists far above the average. Again, "from the anthropologic studies I made in Baden from 1886 to 1894," continues the author, "it appears that among the higher classes the long heads predominate, while among the medium classes the broad heads predominate." Is anything further needed to give to every laborer on the globe a patent of imbecility and to every bourgeois a diploma of intellectuality? But that is not all. "Prof. Julius Wolf has found that the hats of laborers have lower numbers than those of

capitalists, and this fact was confirmed to me by a great German hat manufacturer." After this there is no longer room for doubt; superiority in wealth, it must be evident to every one, indicates superiority of intellect and is its most certain exponent; social inequalities are merely the reflex of natural inequalities; wealth is the earthly garland of genius. If there be some man of genius who is unable to amass a fortune, that very fact proves that his genius is unilateral, asymmetric, unbalanced, "as is the case," the author adds, "with several socialist writers."

Unfortunately, however, these higher classes, to whom is exclusively confided the material and social progress of humanity, are exposed to rapid extinction precisely on account of the excessive mental labor to which they are condemned by their lofty mission. Now, society, whose well-being depends so greatly on these classes, should endeavor, so far as possible, to prevent so deplorable a result, striving by every means to improve the lot of the choicest classes. Hence, far from lending its ear to the insolent pretensions of extremists and burdening accumulated wealth with new imposts, its load ought to be lightened: direct taxes ought to be reduced and finally abolished, and as nearly as possible the whole burden of taxation should be shifted, by means of indirect taxes, on the unintelligent, brutal herd. At the same time, let the issuance of public or state bonds be increased, since this will augment the numbers of those elect, exempt from the vulgar care of administration and management, who will divide their serene existence between the clipping of coupons and the sublime contemplation of the truth. Inasmuch, however, as these and similar devices will not suffice to guard against the extinction of the superior classes, it will furthermore be necessary that they be constantly reinforced, in the best way possible, from the lower orders. But whence comes that inflow of men called on to fill the gaps made in the upper classes of the city? The answer to this is given, in the author's opinion, by a well-known doctrine, which he attributes to Hanssen, though in

reality it is due to Dr Jacoby. According to this doctrine, which Ammon accepts without reserve, the rural population, being in excess of what is needed for agriculture, migrates to the cities and there presently rises to the top of fortune and possessions, supplanting the decadent city families, which are either extinguished or precipitated into the social abyss. So long as the agricultural class furnishes a strong, robust contingent, suitable to replace the ruined city classes, the process of social disintegration and reintegration goes on regularly and efficiently; but the moment the agricultural class becomes exhausted and no longer able to contribute men and force capable of reviving the city people, social decomposition is inevitable, and the state, society, and the race all drift miserably toward ruin.

All history, continues Ammon, shows that decay and ruin overtake nations always and exclusively when the superior classes become extinct while no equally vigorous and active stock is at hand to take their place. At some prehistoric time the autochthonous black-eyed race of Italy succumbed to the long-headed Aryans; Rome fell when the Aryan race of the patricians was overwhelmed by the inferior race of the plebeians. In Gaul, when the national aristocracy was destroyed by Cæsar, the mass of the population, composed of halfbreeds and roundheads, soon fell under the dominion of Rome. Subsequently the roundheads, which to Mr Ammon are veritable Medusa heads, multiplied, and thereupon the politics of France degenerated. In fine, when the revolution of 1789 raised to power the bourgeoisie, whose cephalic index corresponds to that of the mass of the population, the politics of France began to dissolve and the triumph of anarchy was at hand.

Sociology, and its related science, the philosophy of history, thus by itself points out, according to the author, the path which society must follow to effect reforms; so that this society, over which the author is so enthusiastic, after all requires, by his own admission, some wise reform. Nor does he hesitate to formulate

the program of the reform policy, such as clearly emanates from the anthropologic doctrines above set forth. It is in truth a somewhat complicated program; and the very multitude of remedies proposed might lead one to infer that modern society, after all, does not enjoy such robust health as the author affirms. From the rich bouquet of his social reforms we will cull only a few flowers, of the fragrance of which we will leave the reader to judge.

First of all, everyone might know beforehand that Ammon is an ardent opponent of universal suffrage, which represents the negation of the survival of the fittest, since it accords to the unintelligent masses an undue influence over public affairs. On the other hand, he is a friend of war, which he regards as a powerful instrument of selection, inasmuch as (shades of Mameli and Körner, pardon the blasphemy!) on the battle-field only the worse elements of society die, while the better ones come forth from it unharmed, and because the sons born after wars are more vigorous and strong than those who are born in days of peace. In the same way the author advocates all methods of eliminating the heterogeneous and inferior elements from the population; hence he does not disguise his sympathy for the persecution of the Hebrews in Russia, which once more proves the superiority of the despotic rule over the democratic rule which afflicts us.

Let it not be thought, however, that Ammon's Darwinism renders him averse to measures intended to benefit the poor classes. If the fate of society, according to his thesis, is exclusively committed to the rural population, it is absolutely necessary that the legislator shall take care that the agricultural population be prosperous and vigorous; in other words, a sound social evolution cannot be attained except by means of agrarian political philanthropy. Let the economic condition of the country people, therefore, be improved, and greatly so; not by means of their own initiative, but by the generous patronage of the great landowners and the cultured classes. Meantime, in

order to elevate the condition of the industrial laborers, let attention be given also to those laws of workingmen's insurance and to those various reforms "which are the imperishable glory of the never-to-be-forgotten Emperor William I and of his great Chancellor." It is true that these reforms are partial violations of Darwinian selection, inasmuch as they give rise to the survival of weaker and less gifted individuals; it is also true that the advantage which the laborers derive from said reforms is often rather problematic, since employers, in order not to incur the new charges, often close their shops and turn the laborers into the street. Yet nobody can advocate that the lower classes be decimated by misfortune and disease, since a just social sentiment rebels against such attempted extermination.

Hence, the author concludes, we should applaud social reform; but this reform must come from above as a gracious concession by the capitalists, men superior to the brutalized populace, not be extorted by the latter as the result of a reversed battle. Above all, let the working people, so long as found requisite, be tutored, benefited, even fed (not, however, too sumptuously, since over-abundance multiplies crimes against the person); but at the same time let them be kept in the inferior position befitting their intellectual inferiority. The working class should be inspired with sentiments of modesty and of reverence for the upper classes; it should be taught to abandon the baleful aspirations of invading democracy, which, admitting the lowest elements of the population to power, is directly at variance with the dogmas of social anthropology.

Such are the ideas which the author lays before the astonished sociologists of his time. They are not new, since in substance they amount to a sociologic application of those doctrines of Nietzsche which found their proper criticism, and a peremptory one, in the incurable paranoia with which their originator was afflicted. But several observations are peculiar to Ammon, or rather several rather grave errors, which must not be passed without notice.

First of all, his assertion that sociology must be based on anthropology, though at first sight plausible, is, like so many other *a priori* propositions, directly at variance with the truth. In fact, whoever looks at the development of social phenomena must notice that history is only in appearance the work of man, in reality it is the work of things; it is not made by the producers, but by the products, and arises by an inexorable necessity from the process of the distribution of products. Recognizing this we at once understand that the point of departure of the sociologist cannot be the study of man, but the study of wealth; in other words, the mother science of sociology is not anthropology but political economy.

In the next place, when the author observes that the very social and altruistic qualities of man are merely the product of the *instinct of defense*, since this instinct cannot be satisfied except through association, we are led to ask whether one can really speak of an instinct of defense congenital to man? Evidently defense presupposes offense; hence the need of defense cannot be felt by man except subsequently to an offense suffered; hence, also, the instinct of defense, far from being congenital to man, is a subsequent and derivative fact. The author would have been far more logical had he attributed to man a congenital instinct of offense; though in any case he would have found it difficult to explain the reason for this instinct, which does not bear any necessary relation to the undeniable and potent instinct of self-preservation. The fact is, it would seem, that the instinct of self-preservation does not of itself give rise to any instinct of defense or offense, and hence cannot, by means of such instinct, call forth association among men, which on the contrary springs spontaneously from the immanent necessity of production, from the struggle with the resistance of matter, owing to the impotence of isolated labor to overcome it.

The interpretation which the author gives to the biologic theories from which he draws his motives, often shows that he

has not succeeded in comprehending them. This is to be said in particular of his remarks on *panmixia*. According to Ammon, *panmixia* is an obstacle to selection, inasmuch as it leads to the gradual disappearance of the higher qualities in the course of generations. Weissmann, on the contrary, who coined the name of that process and set forth its action with great acuteness, tells us that it determines the disappearance of qualities and organs *which have ceased to be useful to the individual in the struggle for life*, and is therefore the inevitable condition to the production and development of other qualities or other organs rendered useful by the changed conditions of existence.[1] Thus, *panmixia*, far from being an obstacle to selection and to the evolution of the species, is the essential and integrating condition by which they are explained.

But let this pass, as well as the author's enthusiasm over the splendid offspring of princely marriages—an enthusiasm that is daily belied by well-known facts. There is one point, however, which we cannot dismiss unnoticed, namely, the vaunted physical and intellectual superiority of the wealthy classes, which the author tries to impose as a universal anthropologic law. Certainly we cannot successfully defend the inverse thesis, as was done by Helvetius and Adam Smith, and today is reaffirmed by Bücher, namely, that the rich are not rich because they are intelligent, but that they are intelligent because they are rich; in other words, that intellectual differences are solely the result of different social conditions. Surely this proposition contains more truth than the one which Ammon tries to support with rather feeble arguments. That noble and rich families, as he says, have produced a greater relative, not absolute, number of scientists and artists is not only possible but necessary, since only those families were able to give to their sons the education required to cultivate the liberal arts. Or can it be pretended, perhaps, that the sons of the poor, who at eight years, or even earlier, are

[1] Weissmann: *Aufsätze über Vererbung*, Jena, 1892, pp. 559 ff.

thrust into the infernal whirlpool of the mines and factories, can become Byrons or Raphaels? And then, what are we to say of Ammon's startling demonstration of the parallelism between the curve of incomes and the curve of genius? First, let us note that, in order to make the curves coincide, the author is obliged not only to manipulate his data rather laboriously, but also to suppose that individuals deprived of income or afflicted with a negative income are fewer in number than the possessors of the least income. Now, this supposition is ruthlessly belied by statistics, which demonstrate, on the contrary, that the phalanx of the unemployed and the rejects are at present assuming proportions exceeding those of the most wretched fraction of the working class. Given this fact, it is at once evident that one can no longer speak of a curve of incomes, and hence, that the incomes are distributed according to a law altogether different from the law of distribution of genius. But leaving this aside, let us assume that there are really two curves, and that they agree perfectly. In order that this fact may constitute a real proof of the pretended correlation between wealth and genius, the author must prove that the persons occupying the different points on the curve of incomes *are the same* as those who occupy the corresponding points on the curve of genius; in other words, that the successive classes of income-getters are composed of the same individuals who comprise the successive classes of intellects. Now such a demonstration, it is hardly necessary to add, the author does not and cannot give; without it his two curves tell us absolutely nothing, and authorize no conclusions whatever in regard to the question under discussion. Thus Ammon's thesis has no other foundation than the greater width of the hats used by the rich—a frail argument, to say the least, since everyone knows what value can be attributed to the craniometry practiced by hatters.

As regards Jacoby's theory, with which Ammon connects the entire philosophy of history, it must be admitted that it thor-

oughly recognizes the relations of emigration and immigration existing between the two fundamental economic classes, the poor and the rich, and justly attributes to these relations an eminent sociologic importance; yet it is not difficult to see that it gives a far from exact interpretation to the phenomena which it tries to elucidate. In reality, the surplus of the agricultural class that migrates to the city does not go to swell the rich class, but, at least immediately, the poorest and most abject class; they form the social residue of the great metropolis, the dregs of the fluctuating population—dock laborers, stone-breakers, beggars, drunkards, prostitutes. If some members of the destitute class succeed in rising to the ranks of the bourgeoisie, these fortunate ones are not exclusively recruited from among the immigrants from the country, but in large part from the city-born laboring population itself; and conversely, if it be true that some members of the well-to-do class lapse into poverty, they do not belong exclusively to the city population, but may be part of the country population. The fact is that the distinction, rather academic than positive, between city and country, unnecessarily encumbers and obscures the phenomenon of the changeable relations between the poor and the rich classes, a phenomenon which, considered in its real essence, amounts to this: that some members of the poor class, taking advantage of good wages, succeed in penetrating into the rich class, while some members of the latter, ruined by the processes of redistribution of wealth and by the degeneration which wealth at its height produces, drop down into the class beneath; whence arises a *chassez-croisez* among some members of one class and of the other, or a fractional mutation of the individuals of which the two classes are composed.

On the other hand, the theory of Jacoby may indeed explain the decomposition of one race, the degeneration of one people; but it cannot throw light on the much more important phenomenon of the dissolution of the social forms. Let us grant, in fact, that the ruin of imperial Rome, as Jacoby asserts and Ammon

repeats, was due to the extinction of the upper Latin classes and to the exhaustion of the rural class that ought to have replaced them; and that this decay of the Italian population rendered it an easy prey to the strong race from beyond the mountains. But how came it about that, simultaneously with the dissolution of Roman society, the relations of production, which it had developed, were dissolved? How came it about that on the ruins of these there arose a system of economic relations totally different not only from the Roman system but also from that previously existing among the German conquerors? That these phenomena cannot be attributed to the action of the anthropologic factor is shown by the not infrequent examples in history, of entire nations subjugated and destroyed, while no innovation in the relations of property arose from such disaster. More than this, history presents numerous examples of social revolutions accomplished without any accompanying ethnical extinction or revolution, the greatest example being the grand revolution that placed the bourgeois class in power, a revolution accomplished everywhere without being accompanied by any extinction or mutation of race.

Now, all this proves clearly that the cause of social revolution lies not in a change of man or in the anthropologic factor, but in a change of things, or in the economic factor. It is the internal transformation of the relations of wealth production, or, to ascend to its first cause, of the relations between the population and the earth, that constitutes the fundamental factor from which flow, by a natural necessity, the great historical changes in society—in its organic constitution. If Ammon does not understand this, if he is pleased to treat economic phenomena with disdain, if he considers them as a secondary, nay, as a disturbing (!), element of social evolution, it can be explained only by the author's incredible ignorance of political economy, which he appears to have derived solely from the superficial, biased, and partisan publications of Professor Julius Wolf. Sombart pointed out not long ago, and

with good reason, that no economist would venture to write on biology with such ignorance of biologic laws as Ammon showed of economic laws when venturing to theorize on sociology. I will add that the ignorance is aggravated in this case by the shallowness and partisanship of the only book from which the author has gathered his meager and disconnected notions of social economy.

If from this hasty sketch a synthetic conclusion can be derived, it may thus be summarized: The book we have examined may be regarded as a caricature and a *reductio ad absurdum* of the biologic method in sociology, and of the attempts made to find in it the justification of the present capitalistic ownership. Hitherto, in demonstrating the essential fallacy of the so-called Darwinian theory of property, economic arguments had to be invoked, which show that property arises, develops, and disappears through causes altogether independent of the sagacity or incapacity of the owners, through the immanent and fatal process of the relations of production and population. But Ammon's book, with its errors, its paradoxes, and the absurdity of the practical conclusions to which it leads, constitutes a direct proof, drawn from anthropologic and biologic studies themselves, of the fallacy of a scientific tendency which pretends to turn social science into an appendage of anthropology. Desiring to see this attempt abandoned as speedily as possible, we earnestly recommend to all sociologists an attentive and patient examination of the volume which we have criticized in these pages.

THE HARMONIC STRUCTURE OF INDIAN MUSIC

By JOHN COMFORT FILLMORE

NOTE—The following paper was prepared for the American Association for the Advancement of Science which met last year in Boston, but it was not presented owing to the sudden death of Professor Fillmore a few days before the meeting. Through the generous kindness of his widow and son, I am now able to offer it for publication, and to supply from his manuscript records the illustrations he had intended to present with it.

Professor Fillmore entered on the study of Indian music at my request in 1888. For several years previously I had been gathering and examining aboriginal songs, and had discerned in them musical problems that required for their solution not only technical skill, but a broad and comprehensive culture. I sought long and widely to find one with the requisite attainments and the requisite courage to enter this unknown field and to grapple with its unknown problems. At last I was directed by some musical scholars to Professor Fillmore, and the result has proven his fitness for the delicate and difficult task he essayed.

His interest in music as a science added zest to his original research. He writes: "These Indian songs have an important bearing on such questions as the origin of scales, the relation of primitive melody to harmony, the naturalness of our major and minor scales, the progressive development of them, and the fundamental question, What is the line of least resistance for the human voice in primitive man making music spontaneously?" All these questions he lived to solve.

Professor Fillmore's use of the term "primitive man" is not to be taken in its technical sense. He says: "We are now forever unable to get at the real primitive man and to observe his processes in the evolution of folk-song. But surely the songs which show us the actual process of transforming excited howling into songs with unmistakably harmonic pitch-relations, take us very far back toward primitive music-making. What we should find if we could get still farther back I do not know; but I cannot resist the conviction that it would not be inconsistent with the evolutionary process already discovered."

The tracing in Indian songs of motivization, of finding them "as

strictly developed out of modified repetitions of a motive as are the movements of a modern symphony," proved for him "a most delightful and fascinating occupation."

His remarkable work, cut short by his untimely death, bears abundant evidence of his thoroughness as a student; of his power to discern fundamental truths in the most meager material; of his rare gift of tonality which enabled him to exploit folk-songs with an ability never exceeded; of his soundness of judgment and his fairness of statement. He has made possible a study of the evolution of music along lines that correlate with those which have lifted the desultory observations on man into the science of Anthropology.

ALICE C. FLETCHER.

Probably everyone, at the first hearing of Indian music, is impressed with the difference between it and our own. That is my own experience, and is also the experience of all other white people I have known who have come in contact with Indian singing. The impression made is that of a crude, barbaric attempt at music which seems to have very little in common with our own. We do not at once discover what this music means to the Indian; we do not see that the savage strains express, to those who make them, any of those emotions we are accustomed to associate with music. In the case of some of the wilder and more savage tribes, the sounds we hear bear so much greater resemblance to the yelps and howls of wild beasts that we may be impressed with the feeling that these people, when they are singing at least, have more in common with the lower animals than with us.

In the case of many who make no attempt to go below the surface, this impression persists. I have met not only uneducated frontiersmen, but even cultivated people, who seemed unable to get rid of the impression that Indians have no music worthy of the name; that is, no music which is intelligible to us as expressing emotions which are common to the race. I have even known this opinion to be publicly expressed by men distinguished in one or another department of science, and even in music.

There are also many who seem to get the impression that Indian music differs essentially and fundamentally from our own,

not merely in power of expression but also in its melodic structure. Many who have heard more or less of Indian music, either directly or in phonographic reproductions, seem to think that Indian melodies are the product of natural laws different from those which determine the structure of our own melodies. They frequently fail to recognize, in the intervals out of which Indian melodies are made, those which characterize our own; or if they do think they recognize familiar intervals, they also think they discover differences which may be essential, and they fear to class them under our own familiar chord and scale intervals, lest they should, as one scientific investigator once put it to me, "import our Aryan ideas into the music of alien races." In short, there is an impression abroad that Indian music is based on one or more scales different from our own and characterized especially by smaller intervals than any which find place in our civilized music.

In this paper I shall confine myself to an examination of the essential structure of Indian melodies and a careful comparison of them with our own folk-melodies with reference to the intervals of which they are made.

My title to speak on this subject rests on a ten years' study of Indian songs, a study which has been at least honest and careful and as thorough as I have been able to make it. The incitement to it came originally from Miss Alice C. Fletcher, who induced me to study her very large collection of Omaha and other songs. In doing this I had the invaluable assistance of Mr Francis La Flesche, who not only gave me days and weeks of his own time, but accompanied me to the Omaha reservation and obtained for me opportunities not otherwise attainable. This study was afterward supplemented by improving the unusual opportunities afforded by the World's Columbian Exposition, where Dr Franz Boas afforded me the opportunity to study a large number of Kwakiutl and other songs of the northwest, and where I also recorded songs of the Navaho, besides making some valuable collections

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on the Midway Plaisance. I am indebted to Dr Washington Matthews for the opportunity of studying his collection of phonographic records of Navaho songs, and am of course acquainted with the published songs studied by Theodor Baker, Stephen Powers, and Benjamin Ives Gilman. Dr Carl Lumholtz gave me a number of songs which he collected in Mexico among the Tarahumare and Tepehuane, tribes seldom visited by white men; and Mr Charles F. Lummis, of Los Angeles, introduced me to several Tigua Indians of the pueblo of Isleta, New Mexico, from whose singing I recorded some twenty or thirty songs. Other songs have come to me from different quarters during the three years I have spent in California, and last summer I visited the Coahuia reservation in that state and obtained some very valuable material. Quite recently I have obtained from Dr Lumholtz several new songs from Mexican tribes not hitherto reached. I have also listened to several hundred songs recorded on the graphophone by Mr La Flesche, including rituals from at least a dozen tribes and half a dozen linguistic stocks, some of which had never before been exploited. Many of these records are of special value because they come from old pagan priests who have never been in the least affected by missionary work or by contact with the whites, but who were the repositories of the most ancient traditions of their race, of which these songs are an essential part. It should also be mentioned that I have a limited acquaintance with Eskimo songs; and it goes without saying that careful comparison has been made with old-world folk-songs, especially the numerous Magyar and Slavic, and such Arabic, Turkish, Malay, Chinese, Japanese, and other songs as I could obtain. Altogether I have studied many hundreds of aboriginal American songs, of many different tribes and linguistic stocks, ranging from the Arctic ocean to Central America and from the Atlantic to the Pacific, enough, I am confident, to warrant general conclusions as to the laws which determine the forms of our aboriginal melodies.

I say laws, for I assume that the forms taken on by primitive

melodies are no more accidental than are any other natural products, mental or otherwise. Vocal music, of course, precedes all instrumental music by an immeasurable interval. When vocal music is made spontaneously, without reference to any theory, it must follow the lines of least resistance, must obey the general law of all activity, physical and mental. The real questions to be determined, then, in studying the structure of primitive songs, are such as these: What direction does the voice take when primitive man expresses his feelings in song? Is that direction the same for all races of men, or are there different laws which govern the kind of intervals used by different races?

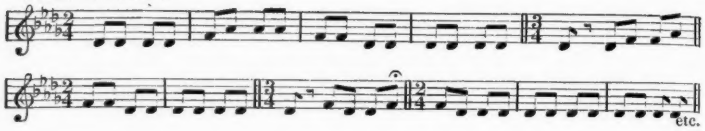
I ask your attention, therefore, to a number of characteristic examples of aboriginal songs, taken from tribes belonging to different linguistic stocks and dwelling in widely separated portions of our country, and which for the greater part have not as yet been published.

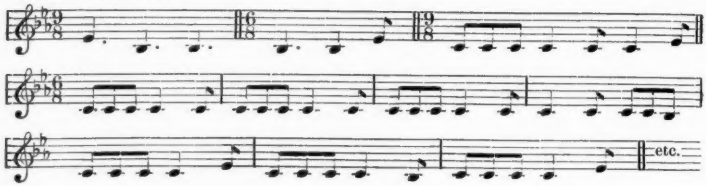
I present first some songs of the Navaho tribe as being the most primitive in character of any I have yet studied. They form, in fact, the connecting link between excited howling and excited singing. The quality of tone is indescribable, being more like a yelp than anything else; but the intervals yelped are unmistakably those of the major chord or of the minor chord.

No. I. NAVAHO.

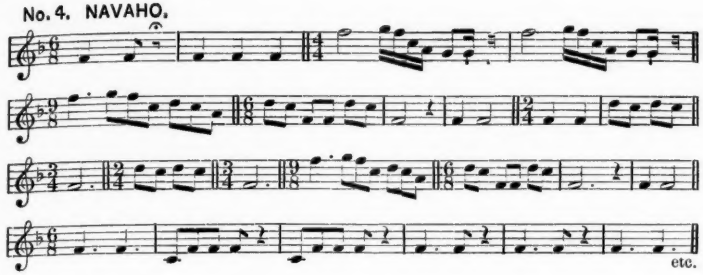
The *tone-quality* is that of shouting, or even howling, but the *pitch-relations* into which they tend to fall are those of the major chord. There is a key-note or tonic which persistently asserts itself and predominates overwhelmingly throughout the song. Associated with this key-note are only two other tones:

the major third and the fifth of this key-note, making a major tonic chord.

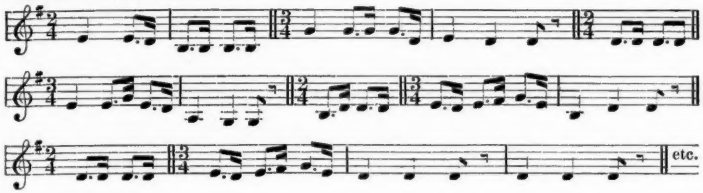
No. 2. NAVAHO.

This song also is made exclusively of the tones which compose the major chord, only here the key-note predominates so strongly as to make the song exceedingly monotonous. The line of these melodies is a chord line, a harmonic line.

No. 3. NAVAHO.

Some of the Navaho songs are illustrations of melody so primitive as to bring us very near to the beginning of music making. In example 3, C is plainly the key-note, and the song is confined mainly to that tone and its minor third, E flat. G, the remaining component of the tonic chord, does not appear at all, but B flat comes in at first so decidedly as to suggest E flat major as the tonic chord. It also appears later as a bye-tone. The implied harmony of the song is plainly the chord of C minor as tonic, and its relative major, E flat.

In all these primitive Navaho songs the gaps between the chord tones are filled up by tones belonging to the nearest related chords, viz., the dominant, the subdominant, and the relative minor. These intervals, when arranged in consecutive order, produce exactly the major or minor scales which we ourselves use, although seldom complete.

No. 4. NAVAHO.

This song is plainly in a major key, the key-note being extremely prominent and the chord tones predominating. The second and sixth tones of the major scale come in as bye-tones, the former being so used at the ends of some of the phrases as to imply the dominant chord. The song is in the well known five-tone scale.

I will now present a song which has more developed diatonic melody than any of the preceding examples:

No. 5. NAVAHO.

The song is in a major key, and tones of the major chord predominate; but it employs somewhat prominently the sixth tone of the major scale and much less prominently the second and seventh tones. Its characteristic melodic phrase—

No. 6. NAVAHO.

which is repeated many times, is as completely diatonic as our own melodies. The sixth of the scale, as here used, plainly im-

plies a harmony closely related to the tonic, either the subdominant or the relative minor chord. The seventh of the scale is here used as a mere melodic bye-tone leading up to the key-note. The second of the scale occurs only once in the whole song.

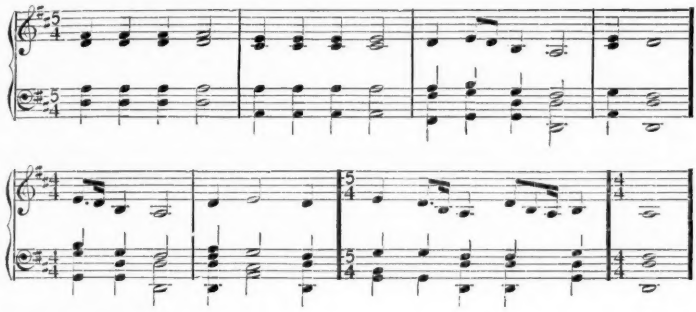
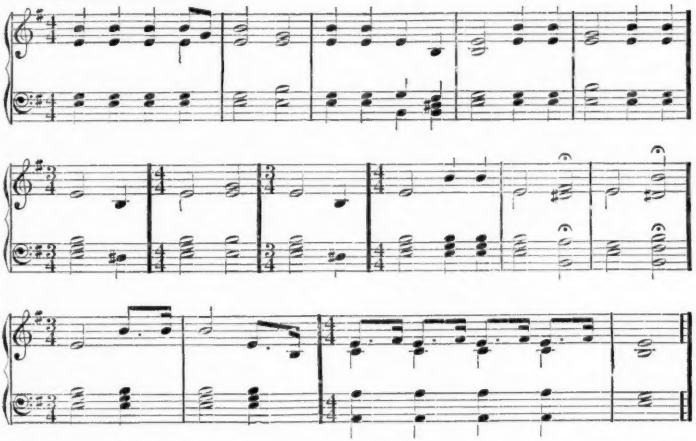
How old these songs may be, I cannot say; but they are undoubtedly very old. They belong to the ancient pagan ceremonies of the Navaho tribe, and I see no reason to suppose that they are in any way affected by the contact of this people with civilization. What these Indians sing in the way of intervals is undoubtedly natural for them. Now, it is a very striking and suggestive fact that of all the Navaho songs I have studied, about one-third have no tones whatever except the key-note and its third and fifth. Of these about two-thirds are major and one-third minor. Nearly half the songs have either the major or the minor chord with a single bye-tone; about one-sixth have the major or minor chord with two bye-tones, and the remainder have more than two bye-tones. *Not one has an interval different from those we employ.* The line of least resistance, for the Navaho at least, is clearly the line of the major or minor chord in the simplest songs. In the more complex ones, one or more tones belonging to the nearest related chord are added, until in the most elaborate songs our full scale appears.

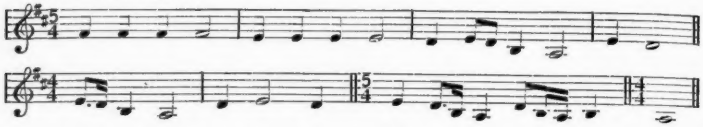
Let us now consider some of the songs obtained from the Kwakiutl tribe of British Columbia, of which I have studied more than a hundred. The results obtained are similar to those reached from the study of the Navaho songs. Although their ethnological character is entirely different, from the structural point of view they are the same. They are all harmonic or diatonic in character.[1]

[1] In order to facilitate the better understanding of Professor Fillmore's analysis of these songs, I give the two Kwakiutl examples harmonized. These songs were transcribed by Professor Fillmore from the Kwakiutl Indians themselves, at Chicago, in August, 1893, during the World's Columbian Exposition. After they had been transcribed they were played to the Indians on a piano, and were pronounced correct. Then, under the Indians' criticism, and with their approval, the harmonization here given was

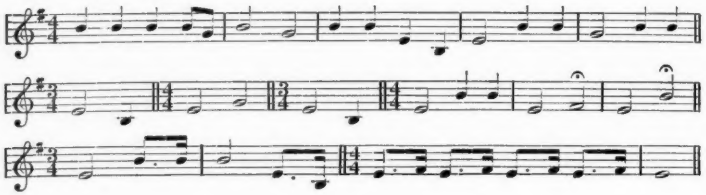
The following example is in the five-tone scale, the major diatonic scale with the fourth and seventh omitted.

added to the aria. The present form, therefore, not only gives the melody as sung by the Indians, but reveals the harmonic structure of the song itself:

No. 7. KWAKIUTL.

No. 8. KWAKIUTL.

Concerning the last example Professor Fillmore writes: "The cadence is best made with the subdominant before the tonic, i. e., a plagal cadence. Although this chord is not *necessarily* implied in the melody, it makes the close more natural, and is most satisfactory alike to civilized and uncivilized ears. All this is directly in the line of my previous investigations in Omaha music, and tends to confirm the conclusions towards which those investigations seemed clearly to point. The most important of these conclusions is, that the forms assumed by primitive songs are determined (unconsciously to those who make them) by a latent sense of harmony; that, conse-

No. 7. KWAKIUTL.

The song is plainly in the key of D major, and every phase of it implies harmony as clearly as does any civilized music. It is built on the tonic, dominant, and subdominant chords; its tonality is strongly marked, and it ends with the plagal cadence which I have so often found in Omaha and other music.

The next song is clearly in the scale of E minor, with the fourth, sixth, and seventh omitted, and implies the tonic and dominant chords.

No. 8. KWAKIUTL.

The next is a song of the Yaqui tribe of Sonora, Mexico. Señor Arturo Bandini, of Pasadena, California, who owns a large ranch on the Mexican border and is intimately acquainted with the Yaqui Indians, assures me that this song belongs to a very ancient religious ceremony. It consists of the tones of a minor chord with one bye-tone near the end, implying the dominant chord. It is the only example I have yet found among our American aborigines of any attempt at part-singing. When it is repeated, the women sing the fifth of the tonic chord to a single syllable at the interval of a twelfth above.

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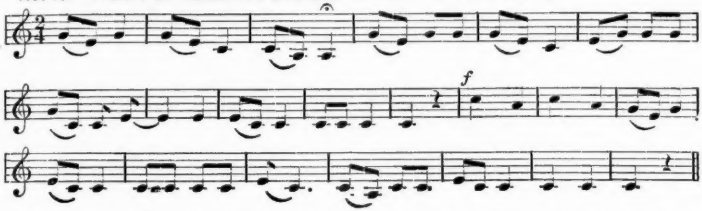
quently, the question of the *scale* on which any given song is built is a wholly subordinate matter, and really resolves itself into the question of *what is the natural harmony* implied or embodied in the song."—*A. C. F.*

No. 9. YAQUI.

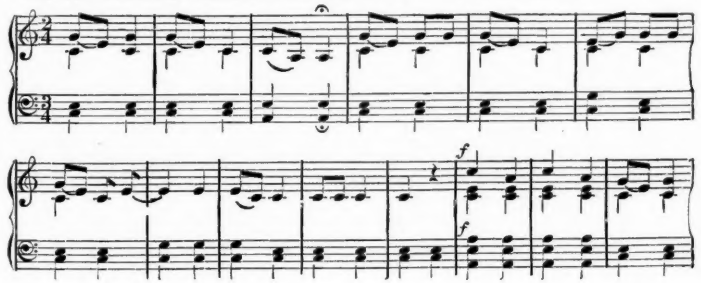
Study of the songs of the Zuñi and Tigua Indians of New Mexico yields the same results. In the following example, a Tigua song of the wheel dance, the tones imply and even actually embody chords. The song is made up mostly of the chord-tones C–E–G, with C predominating. The only other tone in the song is A, the sixth of the scale.—

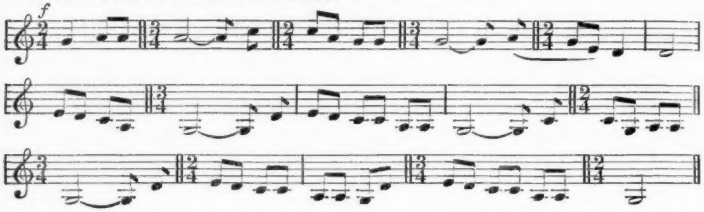
No. 10. TIGUA OF ISLETA PUEBLO. (Song of the Wheel Dance.)

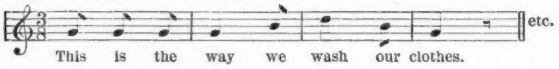


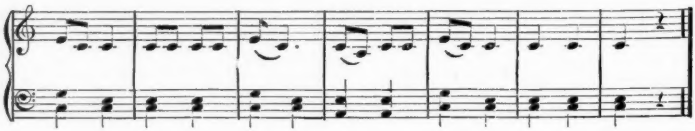
The two chords embodied in the song are the major tonic and its relative minor.[1]

[1] For the sake of clearness I give the same song as harmonized under the criticism and with the approval of the Indian from whom Professor Fillmore transcribed the song.—*A. C. F.*

No. 10. TIGUA OF ISLETA PUEBLO. (Song of the Wheel Dance.)

The next song is from the same tribe and pueblo. It contains the same tones as the preceding one with the additional tone D, the second of the scale, implying the dominant chord. These tones, C, D, E, G, A, make the familiar five-tone scale:

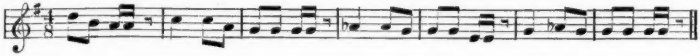
No. 11. TIGUA OF ISLETA PUEBLO. (Song of the Sun.)

The songs of the Tarahumare and Tepehuane in Mexico, those of the Sioux, Winnebago, Omaha, Ponka, Pawnee, and of the various tribes of California, as well as the Eskimo, all show characteristics similar to those already presented. In short, I have yet to find a single song of any of our aboriginal peoples which is not as plainly diatonic and harmonic as our own. If we compare them with any of our real folk-songs, such as—

No. 12. CHILDREN'S PLAY SONG.

the old hymn-tune, "When I can read my title clear," and other examples drawn from bagpipe music, we cannot but see that the differences are merely of an ethnological character; that is, they are differences of style and manner, not differences in essential structure.

The essential thing in all music is the relation of tones to a tonic

or key-note; and the tones most nearly related acoustically to any given key-note *are the tones of its triad.* Then come the tones belonging to its relative minor triad and to the dominant and subdominant triads. Somewhat less nearly related are the tones belonging to the major triads of the under and over major thirds and sixths.

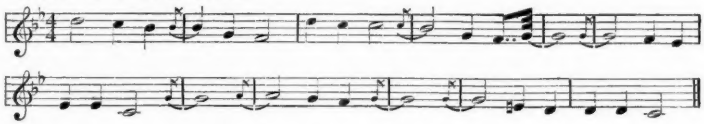
The following Omaha song employs the under major third:

No. 13. OMAHA.



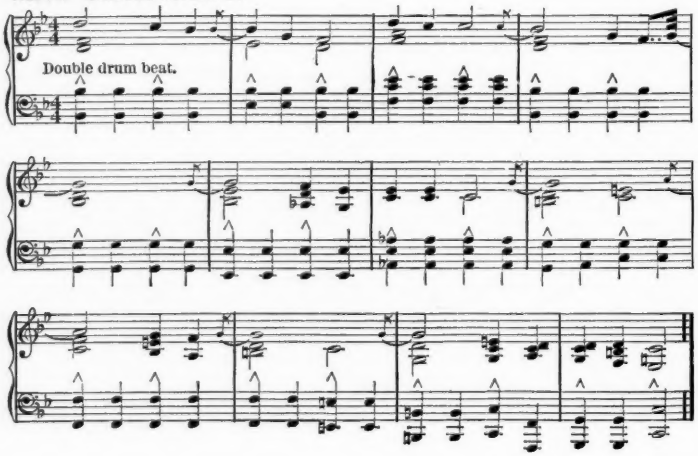
In this example there is a change of key within very narrow limits. The first two phrases, comprising only three measures, would seem to be clearly in the key of G, while the remaining two phrases, of two measures each, seem to be in the key of C. The A flat in the song cannot be treated as a mere chromatic bye-tone; it is an important melodic note—it is principal, not accessory. A flat is the chord of the (major) under-third of C, in which key the song closes, although it begins in the key of G. The tones in this song can easily be accounted for on harmonic grounds, but not by a reference to any known form of scale.

The question of tonality in all these songs is a question to be settled by the help of harmonic considerations and not otherwise. The case becomes stronger when we come to take into account the melodies which more or less plainly imply modulation. The following Omaha choral is such an example:

No. 14. OMAHA CHORAL.

The song begins in the key of B flat, and there is not a single tone in the melody, except the E in the last measure but one, that is not to be found in the scale of B flat; yet the course of

the melody is such as to force on one the sense of a change of key. A study of this song shows its harmonic structure. The original key is kept until the fifth measure, in which the first clause ends with the relative minor chord. The next phrase of three measures is in the key of E flat (the subdominant), the third measure effecting a transition to the key of F by means of the chord of G (the over-third of E flat), followed naturally by the chord of C (the dominant in F). The last clause begins in F, modulates to C in second measure, and closes the period in that key. This key, the major over-second of B flat, the original key-note, would seem to be so remote as to make it impossible to preserve unity within the limits of a short twelve-measure period. But the melodic flow is so smooth and the harmonic connections so natural that one does not get from it the impression of anything forced, harsh, or unpleasant, nor feel the need of a return to the original tonic. The whole choral impresses one with its beauty, nobility, and dignity.[1]

[1] This analysis will more readily be followed by referring to the harmonized version here given. In regard to this version it is important to state that it was made under the criticism and accepted as satisfactory by the men who were the leading singers of the tribe :

No. 14. OMAHA CHORAL.

I now offer for comparison a few specimens obtained from the Midway Plaisance at Chicago in the summer of 1893.

The following is a cannibal song which I noted down in the South Sea Island Theater on the evening of September 2d. The rhythm is strongly marked; the song proceeds on a single tone until the very end, when it changes to a tone which is a component of the dominant chord, assuming, as we naturally do, that the predominant tone is a tonic. I give it what seems to be its natural harmony.[1] It illustrates steadiness of pitch on a mono-

I have many times heard this choral sung by three hundred or more Omaha men and women during the ceremony to which it belongs. This unison-singing in octaves brought out the harmonics so strongly as to make it difficult at times to realize that I was not listening to part-singing.

It may be well to repeat here that it was due to my discovery, some fifteen years ago, that when an aria was played on a piano the Indian preferred it with a harmonic accompaniment, that Professor Fillmore was induced to search for the reason of this strange preference. He wrote concerning this search and his conclusions:

"The songs submitted to me for scientific study, and also for harmonization to be tested on the Indians, caused this suggestion to ripen in my mind, as well as in Miss Fletcher's, into the conviction that the fact of the Indian's preference for a harmonized version of his song when given on a piano, points to a natural and universal law, namely, that all folk-music runs on chord-lines. Study of these Omaha songs, including the harmonizations of them which were submitted to Indian criticism, tended steadily toward the confirmation of this belief, and subsequent study and experience, extending over several years and including a varied observation of the folk-music of different races, have, as I believe, furnished ample grounds for trustworthy induction.

"The laws under which folk-music is everywhere produced may thus be formulated:

"1. Primitive men are impelled to sing, as they are impelled to shout and to dance, by emotional excitement.

"2. All expressions of emotional excitement, whether they be bodily motions or vocal sounds of whatever sort, tend to take on rhythmic forms. Rhythm is the first esthetic element to be developed.

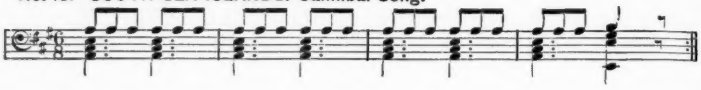
"3. Rhythmical shouting comes after a while to acquire a certain degree of musical quality by becoming recognizably definite in pitch.

"4. This increasing definiteness of pitch manifests itself in three ways: (1) By steadiness of pitch on a monotone; (2) by going, more or less plainly, from one tone to another of a major or minor chord; (3) by moving along the line of a tonic chord with the addition of tones belonging to chords nearly related to the tonic.

". . . The primitive man, when he makes music under the impulse of emotional excitement, moves along the line of least resistance; and if several hundred songs collected from nearly all the races of the earth are sufficient to warrant an induction, *that line is always a harmonic line.*"—*A. C. F.*

[1] I shall give the accompanying illustrations with Professor Fillmore's harmonizations, as he intended to give them on a piano when reading this paper.—*A. C. F.*

tone, and its one movement is to a tone belonging to the nearest related chord:

No. 15. SOUTH SEA ISLANDS. Cannibal Song.

I obtained at the same place the Fiji war dance which follows. It implies a major and its relative minor chord, only here the center of gravity seems to be on the minor and not on the major chord:

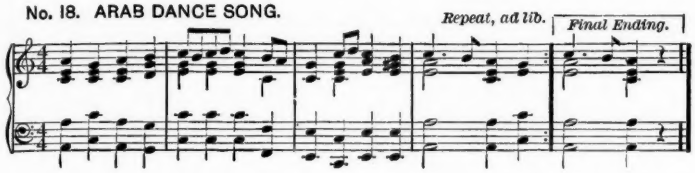
No. 16. FIJI WAR DANCE.

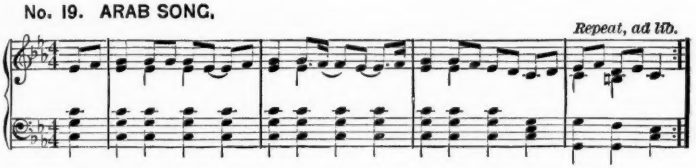
The following war song I recorded in the Dahomey village. Before each of the war dances which I there witnessed, a warrior stood forth and sang a short solo, apparently addressed to the head-chief, who was seated near the orchestra. These solos invariably consisted of repetitions of a single phrase, sometimes modified and sometimes not. One of them was made up of this phrase:

No. 17. DAHOMEY WAR SONG.

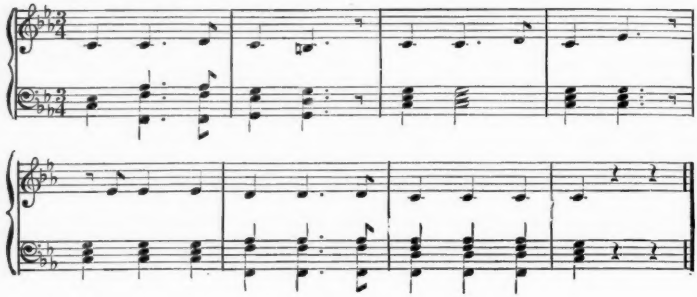
It contains the tonic chord and also A, the tone which, with C and E, would make the relative minor chord of the tonic. It offers another illustration that when the tones move off the line of the tonic chord they move on to the line of a chord nearly related to the tonic.

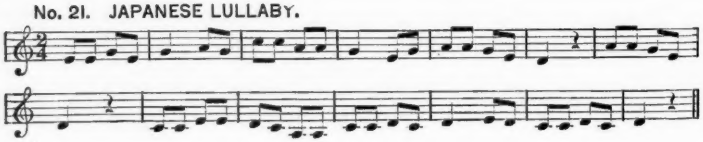
The following Arab dance song, which I heard many times, was first sung by several girls alone, and then accompanied by an oboe while a girl was dancing. It is in a plain minor key, implying the tonic chord, its relative minor and the major dominant:

No. 18. ARAB DANCE SONG.

The next is also an Arab song. It is in minor and implies the tonic and the dominant seventh. The bye-tones, which are rather numerous, all belong to the latter chord:

No. 19. ARAB SONG.

These two examples are particularly interesting, because it is commonly said by musical theorists and historians that Arab music is very different from ours, in that the octave is divided into seventeen tones and such minute intervals are used that the occidental ear cannot appreciate them, except very imperfectly. But Dr Land, a Dutch student of Arabic music, has shown that this is an error. The Arab lute, he says, does indeed provide separate strings for the sharps and flats; but one set is used for the sharp keys and another for the flat keys; the two are never used for the same tonality. By this means each key is in pure tune, instead of being tempered as in our system, so as to make, for example, C sharp and B flat identical. The *tonality* of their music, whether major or minor, corresponds precisely with our own. This tallies exactly with my own observations of the Arab folk-music at the World's Fair.

I obtained the Australian song from Dr Carl Lumholtz, who learned it from the people themselves while he was living with them. Curiously enough, it is much more elaborate than either the Dahomey or South Sea Island songs. The harmony naturally implied in it, is the tonic, dominant, and the subdominant sixth, commonly known as the supertonic chord with a seventh. No modern composer could have produced a song with a more definite minor tonality than has this song:

No. 20. AUSTRALIAN.

I could multiply examples from the Hindoo, Russian, and Chinese, but I give but one more, a Japanese lullaby, which I obtained from M. Takaki, on July 23, 1894. It is in the same old five-tone scale:

No. 21. JAPANESE LULLABY.

In the case of races which have progressed beyond folk-song and have a theory of music and musical instruments, we are of course no longer dealing with primitive music; but it is important to note that even among these peoples their folk-songs are made on the same five-tone scale that we have found among sav-

ages and which is familiar to us in the old Scotch and Irish music.

The process of development seems to be this:

1. The key-note and its chord.

2. The addition of one of the two bye-tones which are the sixth and second of our major scale, probably the sixth before the second.

3. Both these bye-tones come in with the chord to make the five-tone scale.

4. The tonality is major or minor according as the *do* or the *la* is made the point of repose, this probably being determined by the character of the feeling expressed in the music.

5. The fourth and seventh of the major scale are afterward added to complete the dominant and subdominant chords.

In all this process it would seem that *a natural perception of the harmonic relations of tones is the shaping, determining factor.*

It seems clear, also, that this natural perception is the same for all races of men, depending on the physical constitution of the ear and of the vocal chords, and their correlations with the laws of acoustics on the one hand and with the psychical laws of the relation of music to emotion on the other.

But I shall be asked, and with entire pertinency, "Are you *sure* that the intervals sung by the Indians whose songs you have studied are the ones you have transcribed?" I answer without hesitation, Yes, I am sure. I started my investigation with the impression that there might be essential differences in structure between the Indian music and our own. I studied the Indian music for ten years with the utmost care and thoroughness of which I was capable. I have failed to find one single interval in Indian music which we do not use. It is true, I have often heard Indians sing these intervals out of tune; but this is a phenomenon by no means confined to savage or uncivilized races. In every such case, when I was singing with Indians and was able to get at their real intention, I have found that they meant to

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sing exactly the interval we should sing in their place. The false intonation was due usually to precisely the same causes which produce it in our own singers. Sometimes it is an untrained or defective ear; there is just as much difference between Indian as between white singers in this respect. Sometimes it seemed to be due to an imperfect correlation of the ear and the vocal apparatus, just as it is with us. Sometimes it comes from pitching a song too high or too low. In short, an Indian singer, for the greater part, does just what a white singer of his grade of musical culture would do under the same conditions.

But I have observed also special causes for aberrations from the pitch intended by aboriginal singers. Chief among these is *emphasis*. I have frequently known Indian singers to emphasize a tone by striking it ahead of the beat and from a quarter of a tone to a tone above pitch. When I noted these tones down as bye-tones, I was met by the criticism that I had written *two tones when only one was intended.* When I played it emphatically as a simple syncopation, the Indian declared it to be correct.

I have also found Indians vary from pitch under stress of emotion, especially in love-songs. I have noted down intervals as I heard them, only to be told that they were wrong. The Indian *meant* to sing a plain diatonic interval, for he declared this to be correct when I played it. Although he had actually sung it from a quarter to a half tone below pitch, he would not tolerate my playing of anything else than the plain diatonic interval. All of this goes to show, among other things, that the Indian does not make nice discriminations in the matter of pitch. It shows also, what is very clear from all my experience, that what the Indian is thinking about is purely the expression of his feeling, and not the nicety of his intervals,—that has to take care of itself. But it makes the evidence as to the forms spontaneously assumed by his songs all the more forcible.

I have also found that increase of power is almost always accompanied with increased elevation of pitch, and diminution of

intensity with a lowering of pitch, seemingly without the Indian being aware of it. When I have asked Indians to sing louder into a graphophone, they have invariably raised the pitch. Songs which remain of the same intensity throughout I can easily play with them on a piano. Songs which vary greatly in intensity, such as love-songs, do not go well with piano accompaniment, because they vary not only the power but the pitch with every variation of intensity. Yet they will not tolerate these variations when they hear them from an instrument. Clearly they *intend* plain harmonic or diatonic intervals, and are not aware that they vary from them.

The same is true as regards the matter of sliding from one tone to another instead of making the outlines of pitch definite. The practice of Indians in this respect can be matched in any camp-meeting of negroes or uneducated whites in the United States. There is really nothing unusual about it. And as for the Indians appreciating smaller intervals than we do, there is simply nothing of the kind. The Indian ear is not more but less discriminating than our own in the matter of musical intervals; this is to be expected, since he has had no training whatsoever. When he intones an interval a quarter tone off pitch, it is not because he intends to do so, but because he is groping more or less blindly after an interval imperfectly conceived. The instant he hears it correctly given, he perceives that it is what he was trying for and immediately conforms his intonation to ours. That has been my experience over and over and over.

Further, it has been my experience many times repeated that the Indian prefers the harmonized to the unharmonized version of his songs when they are played on the piano—that is, of course, when the chords used are the ones naturally implied or embodied in the melodies. All the Coahuia songs, all the Tigua songs, all the Omaha songs, and many of the others, have been played over and over again for Indians, as many as could be reached at different times, both with and without harmony, and

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always with the same result. With the natural harmonies the songs when played on the piano sound much more natural to the Indian than when played without chords.

In the light of all this experience I feel justified in stating once more, and most emphatically, the conclusion at which I have arrived, namely, that when savage man makes music spontaneously he obeys the universal law of all activity and follows the line of least resistance, and that in every instance this line is found to be a chord line, a harmonic line. Folk-melody, so far as now appears, is always and everywhere harmonic melody, however dim the perception of harmonic relations, and however untrained and inexperienced as regards music the untaught savage may be.

The first harmonies to be displayed are naturally the simplest —those of the tonic and its chord. The more complex relations are gradually evolved as a result of the growth of experience. But in every stage of its development, the harmonic sense is the shaping and determining factor in the production of folk-melody.

The evidence of the essential unity of all music, from the most primitive to the most advanced, is cumulative. The Navaho howls his song to the war gods directly along the line of the major chord; Beethoven makes the first theme of his great "Eroica" symphony out of precisely the same material. The Tigua makes his "Dance of the Wheel" out of a major chord and its relative minor; Wagner makes Lohengrin sing "Mein lieber schwan" to a melody composed of exactly the same ingredients. In short, there is only one kind of music in the world. But there are vast differences between the stages of development represented by the savage and by the modern musician; and there are also ethnological differences resulting from the physical and mental peculiarities of the races; yet, essentially and fundamentally, music is precisely the same phenomenon for the savage as it is for the most advanced representative of modern culture.

TECHNOLOGY, OR THE SCIENCE OF INDUSTRIES

By J. W. POWELL

INTRODUCTION

An industry is an activity whose immediate motive is the production of welfare for self and others. The term welfare has various meanings, but here we use it as signifying welfare of life —not esthetic, moral, expressional, or mental welfare. An industry by this definition means an activity exercised to promote life. We must remember that in this discussion, which is meant to be scientific, whether it succeeds or not, the term *industry* is used in this sense and in no other.

We use *activities* as a generic term including five species: esthetics, industries, institutions, expressions, and instructions. In this paper we are to consider industries.

Technology is the science of industries. An industry is an activity whose purpose is welfare or livelihood. We must here make clear the distinction between esthetic activity and industrial activity. The maid dances for the pleasure of herself or of others. If she dances for others it is a pleasure for them, though she may dance for gain, that is, welfare; still, it is an esthetic activity. A company of musicians make music for an audience; the audience pays for the entertainment. To the musicians the making of the music is an industrial activity, but to the audience it is an esthetic entertainment. Thus, whether an activity be designed for pleasure or for welfare will often depend on the point of view of the person interested therein.

The housewife prepares the meal for her own welfare and for the welfare of others. She may flavor the food to make it more palatable; the purpose of the condiment is thus pleasure; but the preparation of the food is still an industry, the secondary

motive a pleasure. A feast is given for pleasure, but the food still sustains life; so pleasure and welfare are concomitant. In high civilization many activities are pursued for the pleasure of the people by persons who have welfare as their purpose.

Again, what is conducive to welfare may be productive of pleasure. The housewife in preparing the meal for welfare may have, and usually does have, these double motives. If we neglect the motive of welfare and act only from the consideration of pleasure, pleasure itself may be curtailed or pain may be produced. If the housewife, in catering to pleasure, uses condiments that are unwholesome, pain may be produced, and whether her act in compounding the cake be good or evil in effect will depend on whether she has considered both welfare and pleasure; only then do her acts become wise.

Motives are many and usually compound, and it requires no small degree of abstraction to discover the elements of motive even in self, while in others, whose minds are expressed in their acts, the task is still more difficult; for though the motive is best read in symbols of deeds, still, whether it be good or evil is often difficult to say. But every activity is performed for a purpose, and all demotic activities are performed for demotic purposes. We are now classifying activities as demotic activities; but in classifying them in this manner we must ever remember that altruism is founded on egoism and that a demotic activity has an individual effect on the doer. A man may play the violin for others in order to gain money with which to make a journey of pleasure; thus his motive may be immediate pleasure for others and remote pleasure for himself.

This is a concrete world, and abstractions do not exist in themselves, but only in human consideration as abstracts. Every abstract has its concomitants from which it cannot be dissevered, except in consideration. We may classify motives as motives for pleasure, welfare, peace, expression, and wisdom; and by abstraction we may consider any one of these motives, although they

cannot exist apart. Every activity, when performed, involves all of the concomitant effects. The world is concrete, but the method of consideration is often abstract.

Industries are classified as substantiation, construction, mechanics, commerce, and medicine.

SUBSTANTIATION

Certain activities of welfare are fundamental thereto, because they are necessary to life. We must breathe air, we must drink water, we must eat food, we must seek shelter from the elements, and we must wear clothing. In the pursuit of these necessities of life, human activities are employed even in the primordial stage of savagery. Four of these necessary activities are pursued by the lower animals—they seek water, food, and shelter for their young and sometimes for their companions—but artificial clothing is not worn by them. Activities pursued for the welfare of self and others are industries.

The natural kinds fundamentally necessary to man are found by experience to be air, water, rocks, plants, and animals.

Air is necessary at every minute of life, and it is so abundant that man is not required to produce artificial air, though as civilization advances he finds it necessary to provide for its purity.

Water also is abundant. Man does not find it necessary to produce water from its elements, but he does find it necessary to produce it at the place where it is needed and to provide for its purity.

Minerals are found to be useful to man primarily, perhaps, for shelter; soon they are found useful as tools, and he engages in their production by quarrying and mining.

Plants are found to be useful to man as food in all its varieties, as sap, leaves, bark, roots, seeds, and fruits. Plants are also useful to man in providing shelter, and various parts of the plant are used in the construction of houses by human devices. Plants are also found useful to man in fibers as clothing.

Finally, animals are useful to man for food, shelter, clothing, and other purposes.

Thus, tribal man utilizes all of these kinds or natural substances, for which he especially develops the industries of quarrying (the simpler stage of mining) and agriculture for the production of natural plant products and natural animal products. Tribal man uses natural substances developed by natural chemistry; civilized man not only uses the natural substances, but he produces innumerable artificial substances by artificial chemistry.

The production of kinds or substances, whether natural or artificial, leads to the distinction which we are trying to make of the class of industries which we call fundamental industries. They are those in which men engage for the purpose of producing substances, whether they be natural or artificial. Fundamental industries may well be called substantial industries because they produce substances.

All industries are productive industries, and the product is consumed. Production is thus the correlative of consumption, and correlation must be distinguished from reciprocality and from antithesis. Reciprocality is the double consideration of a thing as a whole or as the parts of which it is composed; antithesis is the distinction between good and evil; correlation is the consideration of relation between terms, neither one of which can be expunged if the relation exists. This is the distinction we must make between producing kinds and producing forms. A man may produce apples by cultivation, when he produces a kind; when he produces cider from the apple he produces another kind or substance. A man may produce a flint by quarrying it, or he may produce it even by picking it up; he then produces a kind of rock; but when he makes the flint into a knife, he produces a form.

In tracing a series of transmutations from material to product, we may always reach a stage where the material is finally consumed or used. To use an unfamiliar but very useful term, bor-

rowed from metaphysic, we may say that an entelechy is ultimately reached. The entelechy is the final end had in view by the exercise of an activity.

In tracing material through its transmutations from its original state to its final purpose, there arise a succession of correlations, the terms of which are known as production and consumption. How these terms are used will be made clear by a few illustrations: Primitive man produces flint from the quarry and consumes it in making the arrowheads which he produces. With his arrowheads he produces rabbits; thus his arrowheads are said to be consumed when they are lost or destroyed, but there is still the production of rabbits from the wold, and this production is consumed as food.

The farmer purchases a tract of land covered with forest. The forest land he converts into a field; the forest he consumes perhaps for fuel, and the fuel is the product which he consumes for welfare, and the entelechy is reached. The field remains from which he grows corn, and the year's production of the field is consumed; but the corn remains as a product, which is material for the miller, which he consumes as miller's material by grinding it, thus producing meal; the meal is baked by the housewife who consumes it as meal in producing bread, and the bread is eaten by the farmer's household and consumed, thus producing welfare, which is the entelechy.

The lumberman cuts logs in the forest; he consumes forest trees and produces logs; the raftsman consumes them at the place where they were produced, and delivers them at the mill as the product of his labor; the product is the log delivered at the mill. The log is material for the miller, out of which he produces lumber; logs are consumed and lumber produced. To the builder the product of the miller is material which the builder consumes in the product of his labor, which is a house; the domiciliary user consumes the house in welfare, and this welfare is the entelechy. Maybe the lumber is used for making furniture, then lumber is

consumed and furniture is produced, and the furniture is consumed in the production of welfare, which is the entelechy.

The planter purchases a field on which he raises cotton; the time of the field, that is, its power of producing for a year, or, in other terms, the interest of the purchase money for the field for a year, is consumed in the production of a crop. The labor on the field is also consumed, and the field of cotton is produced. Then the cotton from the plant is picked, and the field of cotton is consumed by the picking of the cotton bolls; the cotton now becomes the material for another process. Overlooking minor operations, it becomes material for the spinner, who makes a product of yarn; the cotton and the labor employed are consumed by the man who makes a product of cloth. Then the tailor consumes it as cloth, together with an amount of labor necessary to make it into clothing; then the clothing is consumed by the wearer, when it reaches its entelechy. Thus land, by a series of human processes through intelligent labor, produces welfare through a series of changes in which labor is consumed.

In the course of production from one kind to another and from one form to another, the domain of nature and art is ransacked for the purpose—air, water, land, plants, and animals are utilized and a multitude of persons are employed.

In the consideration of production we must contemplate the natural material found in air, in sea, in land, in plants, and in animals. The air is ambient over all the surface of the earth as a hollow sphere of gas. The sea has its gulfs, bays, and straits, with its auxiliaries in springs, lakes, and rivers, while the lower portion of the air is laden with moisture which is partially gathered into clouds and precipitated on the earth in rain when favorable conditions prevail. Thus the water is a sphere of liquid which intervenes between air and land. The sea with its auxiliaries yields its materials and the air yields its materials. Plants are scattered over all the surface of the land not covered with liquid water, and over a part of the surface of the land which is covered with

liquid water, and over a part of the surface of the water, while animals inhabit the atmosphere and the watery envelope or hydrosphere. What is usually called the land is but the upper surface of a third sphere of solid rock which is denominated by geologists as the lithosphere; this lithosphere contains another and important portion of the substances which are produced for the welfare of mankind. The lithosphere, the hydrosphere, and the atmosphere, together with the plants and animals of the earth, constitute the environment of mankind. All human industries are therefore included in the consideration of the sources of the substances which men produce.

Hence, when we classify the substances of the environment in these five groups, we classify them in coördinate groups from the consideration of the environment of man, though we may afterward subclassify every one of these groups. We are not classifying substances as fundamental classes, but we are classifying the substances used by man as fundamental classes, and the subclassification will still include only the substances used by man.

Man is a denizen of the air; he lives on that portion of the surface of the lithosphere which is called dry land, where the watery envelope is vapor. Thus he is directly connected in his environment with the three spheres and utilizes them for his purposes. Man is not content with thenatural products of the lithosphere, but he seeks to improve them. He is not content with the natural products of the hydrosphere, but he seeks to improve the water by purifying it or by charging it with other substances. He is not content to drink like the beast from the pool or the stream, but he seeks to bring the water to himself in the most convenient and best manner in which to enjoy it. Man is not even content with breathing the atmosphere, but he seeks to procure it in its purity, so he ventilates his habitation and otherwise secures the greatest purity. Man is not content with the plants as they are furnished by nature, so he improves them by cultivation and multiplies those which are useful to him and destroys

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those which are useless or injurious. Man is not content with the animals, so he improves them by zoöculture and he destroys the useless and the injurious.

To designate those industries in which men engage for the purpose of producing kinds or substances, we need a technical term which will distinguish them from all other industries; for this purpose I use the word *substantiation*, which must here mean the artificial production of substances for human welfare. I have sought long and far for the best term. I may not have chosen wisely, but I have chosen with all the wisdom of which I am possessed. It does not lie in the prerogative of another to reject my term when he attempts to understand my meaning, though it may be his prerogative to use another term when he desires to express the same meaning. If the distinction pointed out is a valid one, and useful for scientific purposes, a distinctive term is necessary; if the distinction is invalid or unfruitful to science, it may be neglected. Do not quarrel with me about my terms, but quarrel with me about my distinctions. If you decide that the distinctions are good, then accept my terms as they are used, still reserving the right to use better terms when you wish to set forth the same concepts.

In the transmutation of materials into products, the processes must be invented; but the product which is sought in manufacture may be but a small part of the material used. Metals are extracted from the ores, while the residuum is often valueless. Quinine is extracted from the bark of cinchona trees, and the product is very small compared with the trees. Sometimes secondary products are found still of value to mankind. From asphalt and other hydrocarbons illuminating products are manufactured, and from the substances which do not subserve this purpose aniline dyes are extracted. So by invention a multitude of substances are derived which serve human purposes. Forever by art, substances are multiplied and their manufacture specialized. (1) In modern culture man produces pure air by purifying it;

(2) he produces pure water by purifying it; (3) he produces various substances by mining and metallurgy and other chemic processes; (4) he produces plants by plant culture, and (5) he produces animals by zoöculture. Thus, the fundamental industries, which we here call industries of substantiation, are industries for the production of kinds.

CONSTRUCTION

The next class of industries in which men engage are those which are designed to modify the forms of things for use. Here we must call attention to the distinction which we make between *kind* and *form*. In popular usage these terms are interchangeable, but in science we must use terms with single meanings; this is a fundamental requirement. The failure to observe this law opens the door to idle and vain speculation. We may find an illustration of what is meant by kind in ordinary enumeration and in the devices which men have invented to represent numbers. We have ten units as a sum; the ten units constitute but one ten, twenty units constituting two tens, and a hundred units constituting ten tens. The ninety-ninth is but one of the units of a hundred; it is but one in the last unit of the second order which constitutes the hundred. Counting is fundamentally determination of kind; and counting, like classification, is first determining a kind and then seriating the kind to obtain the class. I wish to count the horses in the field, and I must first distinguish the horses from all other kinds in the field and then enumerate them. This is counting. But if I distinguish the kind of horse and include them all as horses, I thus include all of this kind in nature. The difference between counting and classifying exists solely in the nature of the series which we consider. I invariably use *kind* in this sense and in no other.

Form signifies figure and structure, and implies the relative position of the parts which make up the whole. This distinction which I make between kind and form must be held permanently.

You must not fall into the habit of confusing the terms as is done in common speech. In science we must use form to mean one thing and kind to mean another, and unless we adhere to this it is impossible to make scientific advance. Every man loves to use words as his neighbors use them, for speech is but a convention, and unless the convention is understood by others it is an unknown tongue; but no man has a right to demand of another that he use his words with the same meanings as himself if the other defines his meanings, and still less has he the right to demand that another should use a word with many meanings and thus obscure his language.

Man produces the clay when he digs up the kind of clay, or he may produce the kind of clay by mixing ingredients; but when he molds the clay into a brick he determines the form. He may mold the clay into a vessel, then he also determines the form in which it is useful.

Man produces forms of things that he may utilize air, water, rocks, plants, and animals. He utilizes air when he produces things that insure proper ventilation. A chimney is a form for this purpose; an opening in a room and a shaft in a building are forms of this character; a fan is a form designed to secure a better movement of the air.

For the utilization of water primitive man constructs a gourd into a drinking cup, or he molds clay for the purpose of holding water, or he constructs wicker-work jugs for this purpose; so man digs wells and constructs reservoirs, and lays pipes for the transportation of water, and in higher civilization he constructs filters for the purification of water. Thus, innumerable forms are constructed by man for the utilization of water.

In the same manner many forms are produced for the utilization of rock material. The rocks are built into houses as rock structures proper; the clays are molded into bricks or adobes to be built into houses. Iron is extracted from the rock and molded into innumerable forms for men's use. Copper, gold,

and silver are in like manner produced as substances and wrought into forms which serve men's purposes for welfare.

Plants are used for fuel and wrought into forms that they may be utilized in stoves and furnaces. Plants are also wrought into forms of lumber and used in constructing forms of houses, furniture, vehicles, and ten thousand other shapes, that they may be useful to man; and many substances are extracted from plants to be wrought into forms. Many resins are used in this manner; indeed the productions of forms from the product of the rubber tree that are useful to man are too great for enumeration.

Time fails me to tell of the innumerable forms into which animal substances are wrought for the use of man. But animal substances and vegetal substances have their grand use as food. The forms into which they are converted before they reach the entelic use are innumerable, but the subject is so often illustrated in daily life that to call attention to the fact is all that is necessary to our purpose.

In the production of entelic forms many ancillary forms are produced. These, perhaps, are so apparent that they need no further illustration; but the forms which are produced by man through industrial processes that serve the entelic purpose of welfare are innumerable, and when we distinguish them it becomes necessary for us to group these industries under one term in order that they may properly be distinguished from the industries of substantiation and from others which we have yet to consider. I shall therefore call them the industries of *construction*, as that term seems best to convey the concept. In late years there has grown up in science the use of a term which clearly sets forth the nature of the products of construction as the term is here used. This is artifact; the products of construction are artifacts. Construction, therefore, is the industry of producing artifacts, just as substantiation is the industry of producing substances. As substantiation is the art of producing substances from air, water, rock, plant, and animal, so construc-

tion is the art of producing useful forms of artifacts from air, water, rock, plant, and animal.

Form and kind are concomitant. There can be no kind without form, and there can be no form without kind, and the distinction which we here make is but a distinction in consideration which classifies the industry. The world is concrete; but man's method of looking upon it is often abstract, and so his knowledge is ultimately built up into concepts of concrete things, which are first considered as abstract things when concepts of abstract things are utilized. All properties and qualities are abstract, but they inhere in concrete things. Concrete bodies and their abstracts as properties and qualities require abstract concepts for their cognition. Again must we recall the demonstrations of the pentalogic essentials of every particle of matter incorporated into the bodies of the universe. That there are five and only five of these essentials is the ultimate purpose of this discussion, and the ultimate demonstration must remain in view if we are to understand the nature of the argument.

MECHANICS

In classifying industries as those of substantiation or those of construction, we were compelled to use terms with specific meanings, and we selected the terms used because they seemed to be the most available for that purpose and because there seemed to be no terms in use for the industries which we wished to discriminate. Manufacture etymologically means "made by hand." In all industries the hands are used to a greater or less extent, and the term is used with this wider significance, so that its etymology and wider use alike forbid its employment to signify what we desire when we adopt the term construction. In the case of *mechanics* we have a term which is already used in science for the purpose we wish, signifying the industries which have for their purpose the utilization of powers.

The mechanical devices as forms which are employed in the

utilization of powers are the hammer, the lever, the wedge, the wheel, and the pulley.

A hammer is a device for condensing the motion of a ponderable body through a space in a time and expending it in an instant; or it may be defined as the method of expending gathered momentum in the instant of impact.

A lever is an instrument which is used with a fulcrum to move a weight by taking advantage of the motion in an arc of a larger circle to the correlative arc of a smaller circle, so that the force of the long arm is expended in the short arm. A smaller mass is thus made to move a larger mass, but the smaller must move a greater distance. A hammer which is used for percussion is often supplied with a handle, which is a lever with a fulcrum in the edge of the hand. Thus the long arm of the lever is next to the hammer, and the momentum of the hammer is increased thereby.

A wedge is an inclined plane used to subdivide the distance of the weight moved into minute parts. The wedge itself is usually employed in conjunction with the hammer, the wedge being a device for subdividing the distance moved, and the hammer being used to take advantage of the force of percussion.

A wheel is a device for reducing friction, and the friction is reduced inversely as the perimeter of the wheel is enlarged over the perimeter of the axle. The wheel is variously modified for the reduction of friction.

A pulley is a succession of wheels so geared that the force applied must move over a greater space than the weight to which it is applied; hence a larger mass may be moved by a smaller, as in the case of the lever.

These forces—the hammer, the lever, the wedge, the wheel, and the pulley—are often combined in the same mechanism. Thus, in the screw, the lever and the wedge are combined, but the wedge is a spiral wedge. These fundamental mechanical devices are combined in a great variety of ways in the machinery of the industries.

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These devices for applying power are sometimes called the mechanical powers, and the powers themselves are called forces, for they are devices to produce modes of motion.

Again I must remind the reader that there is no such thing as abstract power; it is always concrete, and its concomitants must always be considered when we consider real power as such. Power exists as an abstraction only in consideration.

Having considered the nature of powers, we have now to consider them as they are utilized in tools and machines. A tool may be defined as an implement employed to utilize human power. A machine may be defined as an implement employed for using any other power than that of human muscle. The tool is dependent on the hand and is adapted to the use of the hand, while the machine is adapted to the use of other powers than that of the hand, though these powers may be directly or indirectly controlled by the hand. A flint may be fashioned into a knife on a grindstone supported by a wooden horse; the grindstone is a tool, but it may be run by water-power, when it becomes a machine, for it must be provided with the apparatus necessary to utilize the fall of water. A hand-hammer is a tool; but a trip-hammer is a machine, for some other power than that of human muscle is used in its operation. The hand-dasher in a churn is a tool; a power dasher in our modern dairies is usually a machine. The flail is a tool used only by human power; the thresher is a machine in which horse-power or steam-power is employed.

In the multiplication of processes, which we have already illustrated somewhat, many machines are employed in the manufacture of a single class of products. Often these machines are housed for their protection and for the protection of the laborers who are operating them. Such a group of machines with their houses is called a mill or a factory. In the mill many machines may be used, and many tools, all designed for the common purpose of producing a class of objects.

It now remains for us to set forth the classes of powers which are used by men to promote their welfare. These are muscular power, wind-power, water-power, heat-power, and electric power.

Muscular power—This power is the primordial force used by mankind, first as human power, but in the second stage of human culture animals were domesticated and used as beasts of burden. Especially is one animal used for this purpose, namely, the horse, and the power of a horse for a definite period of time, established conventionally, has come to be used as the standard of measurement for powers. Animals are used not only for carrying and hauling burdens, but they are used also for impelling machinery.

Wind-power—Wind-power is used to propel machinery and especially in the navigation of water to propel vessels, and the machinery devised for the latter purpose consists of masts and sails. In the early history of civilization the propulsion of vessels and the running of mills were relatively much more common than at present, and yet this power is widely used. Since air has been liquefied it seems likely that this substance is to play a still more important role in mechanics, and air is to become a commodity.

Water-power—Water-power is used chiefly for the running of mills. The tides as they rise and fall are utilized in their onward rush to impel mills by the construction of the necessary machinery, and the fall of water in running streams is utilized for the same purpose. Water is used also as steam to connect heat-power with machinery.

Heat-power—This power is obtained from the combustion of plants and animals and the hydrocarbon products derived from them. Steam is but a medium through which heat-power is applied.

Electric power—Electric power is also a medium for transmitting wind-power, water-power, and heat-power; but it also seems to be an independent power itself. Not being a physicist I am not competent to properly discuss this subject.

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This whole discussion of mechanics may be considered as exceedingly elementary and to be but a simple exposition of common knowledge. It serves the purpose of this discussion all the better for this fact, for we are trying to exhibit the nature of the activities in which men engage for the purpose of classifying them and discovering how five properties of matter and only five are recognized in these activities, and for the further purpose of showing how they lead to five classes of emotions.

COMMERCE

The fourth great class of industries in which men engage for the purpose of obtaining welfare is *commerce*. Men do not produce substances everyone for himself, but everyone for others. They do not produce constructions everyone for himself, but everyone for others. They do not produce powers everyone for himself, but they produce powers everyone for others. The production of substances, artifacts, and powers are designed for the consumption of others; they thus become the materials for exchange, which are then goods.

Goods are produced, as we have already seen, by substantiation, construction, and mechanics, and there are other agencies which we have not yet considered. These products pass from one person to another in exchange before they are consumed as an entelechy. Every exchange implies a production and a consumption until the entelic consumption is reached.

The five properties of matter give rise to five elements of commerce, which we must now set forth. The first element of commerce consists of the goods or kinds of things which are exchanged. The second element is transportation, which means the transfer of commodities from one person or place to another. The third element is the labor involved in making the exchanges. The fourth element involved is the money employed as the medium of exchange and measure of value. The fifth element employed is advertising, which is the method of informing those who desire

goods for consumption that others have them and offer them in exchange for money. The five elements of commerce, therefore, are goods, transportation, merchandizing, money, and advertising. Every one of these elements of commerce involves activities—the activities of producing goods, the activities of transportation, the activities of exchange, the activities of finance, and the activities of advertising. They follow in this order from the nature of qualities which are derived from properties. Nature has established the order in which properties must be considered, for Nature herself considers them in this order. Now we have to consider the five elements of commerce severally for the purpose of considering the elements of which they are composed.

Goods—Goods are classified as esthetic, industrial, social, linguistic, and instructional.

Esthetic goods are ambrosial, decorative, athletic, gaming, and fine-art goods. These may all be reclassified in five groups. We have already seen[1] how the fine-arts may be classified, giving rise to goods which are musical, graphic, dramatic, romantic, and poetical. In the same manner industrial, social, linguistic, and instructional goods may be classified and reclassified. Every value which man produces becomes goods, for in its production he expends activity, which is labor, and receives in return for his labor the goods which he desires. In modern society the goods are obtained through an intermediate commodity—money—which is the measure of value and instrument of exchange.

Transportation—As men produce not for themselves but for others, and receive money in exchange which they expend for themselves, the things which they produce must be transported to the others. A man may produce an article which his next-door neighbor uses, and the transportation from one to the other is but an inconsiderable item. But the production may be a hundred or a thousand miles away; then the transportation be-

[1] *Esthetology, or the Science of Activities Designed to Give Pleasure* (AMERICAN ANTHROPOLOGIST, n. s., vol. I, p. 16).

comes an important element in commerce; hence ships and railroads are constructed, and large bodies of men are employed in these industries. At first thought these industries along the great highways seem to absorb our whole attention, but on more minute consideration we find that the transportation of commodities for short distances is no inconsiderable item. Thus, the transportation of the bread, milk, and other items of trade through the streets of the city and the highways of the country, from the marts of trade to the individuals who are the entelic consumers, is of much relative importance. The transportation of commodities altogether will be found almost to vie in importance with the production of commodities by substantiation or construction or mechanism. We find that all of these operations are concomitant.

To the carrier, goods transported become freight. Goods and freight, therefore, are the same thing from different standpoints of consideration. In transportation we have to consider not only the freight but the substances, the constructions, and the powers employed in freighting, as well as the persons who direct the operations.

We must notice the correlation involved in transportation. In every transaction which involves transportation there is a producer and a consumer, and each party is both. The man who produces wheat is the consumer of the goods for which he exchanges wheat, so that there is correlative transportation. But the subject of correlation is to some extent masked through the employment of money as a medium of exchange, for as goods are not exchanged directly, the correlation of transportation is in the first step the transporting of money in one direction and the transporting of goods in the other. When credits are used as symbols of money, the correlation is still further masked, and wherever a man may be he has demands which must be supplied. These demands must be transported to him, because he lives on the goods produced by other men which must be transported to

him. The ultimate correlation is dependent on the equity of transactions.

There is still another phase of transportation that must be mentioned without stopping to fully set forth its nature. A man's wants may be supplied by transporting supplies to himself, or they may be supplied by transporting himself to them. No inconsiderable part of transportation is employed in transferring individuals themselves.

The substances that are employed in transportation are air, water, rocks, plants, and animals. The constructions that are employed in transportation are (1) those which are designed to utilize the air, such as ships that are impelled by sails and pneumatic tubes which are utilized by air pressure; (2) those constructions which are employed to utilize water for transportation, such as the steam-engine and that machinery by which material is transported from one part of the mill to another by water-power; (3) those which are employed to utilize wood, or coal (which is fossilized wood), for transportation; (4) those appliances which are necessary to utilize animal muscles for transportation, such as saddles, common road vehicles, and all of those articles which have become necessary when human beings transport freight; (5) all of the tools and machinery which are employed in the utilization of electricity for transportation.

Exchange or Merchandizing—The man whose industry is buying and selling goods is the exchanger, and he regards goods or freight as commodities. Goods or freight thus become commodities to him, but the merchant has to buy his commodities instead of to manufacture them. The industry of merchandizing is therefore distinct from the industry of transportation, as the merchant is also distinct from that of the mechanician who produces useful powers, or from the constructor who produces useful forms, or from the industry of the man who produces useful substances. The elements of merchandizing are buying, storing, exchanging, delivering, and gaining. In buying, the merchant must consider

the wants of the people; in storing, he must consider preservation of the goods; in exchanging, he must consider the value of the goods; in delivering, he must consider the distribution of the goods to his customers; and in considering gains he must consider the total cost to himself and compare it with the amount received, which may show profit or loss.

Money—This leads us to the fourth element of commerce, *i. e.*, money, which, as one of the commodities, has to be considered as a value in relation to the other commodities, which are goods. Money consists of gold, silver, subsidiary coins, bank-notes, and credits. In different stages of culture different articles have been used as money, such as shells, wampum, peltries, tobacco, and cattle; but in modern civilization the five kinds of money are almost universal.

It has already been considered important that the value of money should be permanent, so far as this can be secured by human agencies. If we consider long periods of time, this has never been accomplished. The device which the more advanced nations have adopted is to make either gold or silver or both, at a fixed ratio, the measure of value, and then by statute to provide that subsidiary coins should be issued by the government. It is provided further that bank-notes should be made exchangeable with coin at the option of the holder who presents them for payment; but in modern times credits are very largely used in transactions, so that much of the money used in commerce is of this nature.

The business of the banker is the handling of money for a profit. He must therefore be a capitalist—must have money of his own,—and the amount of money or credit of others which he handles, other things being equal, will depend on the amount of capital which he has invested either directly in banking or as security which it affords to the public in his transactions. In modern business much is transacted by credits, which are a kind of money, and the capital of the banker is held by his customers

as either moral or legal security to them. The business man deposits money with the banker and draws it out on check from time to time as he uses it. A banker, having the deposits of many men, finds that he has in his custody a surplus of money which is more or less constant. This surplus he lends at interest; he also lends his own money; his profits, therefore, come from the lending of money—either his own or the money deposited. The banker lends money to the public, but he is especially a lender of money to his depositors; thus, a merchant may deposit money by giving his note bearing interest, against which he draws by check.

Advertising—This leads us to the fifth element of commerce, which is advertising. In advertising, that which was first considered as goods, then as freight, then as commodity, then as value, is now considered as want. The merchant's business is to supply want, and it becomes necessary for him to inform the public of the goods which he offers for their supply. The method of giving this information to the people is advertising. The primal method of advertising is by the display of the goods themselves by the merchant or his assistants; no small proportion of the time of the salesmen is occupied in displaying goods to purchasers. The second method of advertising is by the display of goods in conspicuous places, especially in show-windows; this method of advertising has now become well-nigh universal; show-cases and window-cases are arranged with deft hands in order to make goods attractive. The third method of advertising is with post-bills, which are placed in conspicuous positions—on the walls of buildings, on fences, and by the wayside, or worn on the backs of men. The fourth method of advertising is by the distribution, through carriers or by the mails, of hand-bills, which are designed to inform the public of the character and prices of the goods offered for sale. The fifth method of advertising is the insertion of such business announcements in books and periodicals. Much of the advertising is now absorbed by the peri-

odicals; the daily, weekly, monthly, and quarterly journals are to a large extent supported by advertisers who display in type the goods offered for sale, but the journals themselves are introduced to the public by the publication of news and the discussion of current topics, all of which are desired by the people.

MEDICINE

We have now to consider an industry which is designed to secure welfare for mankind in preventing, alleviating, and curing the diseases or other injuries to which men are subject. This industry is founded on the importance of securing the best opinions of men especially trained in the learning which pertains to sanitation and the remedies which are discovered to alleviate and cure diseases; it is especially an industry of opinions. Formerly this feature of the industry was somewhat masked by the more or less constant habit of medical men to furnish the medicines and appliances which they use, and to charge for the same rather than for their opinions. But an industry has been differentiated from medicine proper and is relegated to the apothecary who supplies, as merchandise, the medicines and appliances, and the merchant obtains them from manufacturers who produce constructions and substances.

Here we have to note a peculiar habit of language by which the industry of medicine is called a profession. It will be observed that those persons who engage in the highest form of esthetic art, which we have called the fine-arts, and who make a business of producing kinds of pleasure for others, are called professionals. In general, a professional is one who claims to be such an expert in his industry that he can command welfare for himself by the production of an esthetic commodity. We might stop here to show how the lawyer or the judge is also called a professional, but it will be sufficient for us to notice that the term is applied in common usage to denote a high degree of excellence in an industry, and that it usually pertains to those

persons who engage in the fifth grade of arts, as we have designated them, namely, esthetics, industries, institutions, linguistics, and opinions. In medicine, the professional medical man is remunerated, not for the medicine which he furnishes, but for the opinion which he gives.

Thus, in the order of arts which depend upon the properties, the fifth property of consciousness gives rise to a fifth industry of welfare, which we call *medicine*.

The subject of medicine is fundamentally controlled by the five properties of human bodies and the organs which are developed severally for these properties. These are (1) the organs of metabolism or animal chemistry; (2) the organs of circulation or animal construction; (3) the organs of activity or animal locomotion; (4) the organs of hereditary genesis or reproduction, and (5) the organs of the mind or the nervous system. In order that the opinions of the medical man shall be of value, he must acquire a knowledge of the metabolic, constructive, muscular, reproductive, and nervous systems of the human body. This is fundamental.

Here it may be well to call attention to the organs of circulation in order to show that they are organs of construction, though motion is involved therein; for the properties are always concomitant. But when we consider circulation, we are considering it as the placement of the erythrocytes which are brought to the parts where they enter into construction. We are not considering the power by which circulation is accomplished, nor are we considering the motion of the particles as trajectories, but we are considering the constructive result which arises therefrom, together with the result which is produced in removing waste material. We are not considering how the removal is accomplished, but the results of the accomplishment.

For the sanitary knowledge which he must obtain, the medical man must acquire a knowledge of the substances which men use in continuing life on this planet—air, water, rocks, plants,

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and animals,—and how they are kept pure from deleterious substances or conditions. This function of the medical man is of modern origin, and belongs solely to the scientific period of medicine. We have to thank the medical profession for a vast body of scientific knowledge relating to this subject. It is the glory of the profession that its most arduous labors, its greatest scientific discoveries, and its most enthusiastic pursuits are devoted to sanitation.

Remedial medicine has a long and interesting history. We have already seen, in the account given of Esthetology, how the fine-arts are involved in the superstitions of mankind when they also play an important role in the religions of the world. Now we have to see how these superstitions control the practice of remedial medicine. In every early society there is used a word which has the significance of "priest" as well as "doctor." The word "shaman" has come to be used as the representative of such words. We have already seen how esthetology was emancipated from religion. We must now set forth how medicine was emancipated from religion, for in the earlier stages of culture, when the opinions of mankind were mostly superstitions, religion essayed to control all human activities, and the priest was the dictator in every field of life; especially was it true of all those tribal and national organizations in which the head of the ecclesiastical body was also the head of the political body, and thus church and state were one. How this state of affairs originated we cannot here set forth in any adequate manner, but we are compelled to refer to it in treating of the subject of medicine, and to make a brief characterization of the nature of early remedies.

Here we must set forth the doctrine of what I shall call *imputation*. Imputation is the practice of attributing effects to erroneous causes, as when I impute the pain which I feel in my head to a spell which has been wrought upon me by a witch. A superstition is an opinion which a man may hold by reason of imputation.

Now, we are briefly to consider how this practice originated. Savage men always impute mind, or organized consciousness, to inanimate things, such as plants, rocks, the phenomena of water, and phenomena of the atmosphere. They also impute mind to the heavenly bodies, which they suppose to be molar bodies in the tent of the sky, which to them is the great wigwam of this world. If the savage strikes his foot against a rock and seriously wounds himself, he fails to attribute the accident to his own carelessness, but he imputes it to the rock itself, as being designed by the rock in order to injure him. Thus motives are assigned to all inanimate things, and events are brought about by others, animate or inanimate, which in fact are due to this activity. This is the fundamental phase of imputation.

Then tribal men believe that mind, which is a property of animal bodies, is a property of all bodies, and that this property is not a concomitant of the body and inherent in the body itself, but that mind is independent of body and can live apart from it, and when the mind leaves one body another mind may take up its residence there. This is the doctrine of ghosts as free, independent, and wandering minds.

There are many phenomena which to the savage mind lead to this opinion. I may briefly mention them: The phenomena of dreams, where men seem to go out of their own bodies and wander about the earth; the phenomena of ecstasy, produced by excessive mental or physical activity, where men seem to have visions of other times and places or to hear voices which do not speak in their ears; the phenomena of hypnotism, where men seem to see scenes which are not naturally presented to the hypnotized person; the phenomena of intoxication, where men believe they observe that which bystanders know to be not true; the phenomena of insanity, where the diseased person has thoughts which are erroneous, in which cases the savage believes that the ghost of another has taken possession of the invalid. The doctrines derived from these sources seem to be confirmed to the savage mind

by the phenomena of shadows and especially of echoes. Hence, in tribal society a ghost life is held in universal belief. Thus to imputation is added the ghost theory, or spiritism.

The savage man imputes the diseases which afflict mankind not to the bodies with which he peoples the world with animal creatures, but to the ghosts of these bodies. Hence we often find in a savage tribe that diseases are classified in a more or less vague way as the diseases of the stars, the diseases of the waters, the diseases of the rocks, the diseases of plants, and the diseases of animals. He does not consciously classify them in this manner, but he imputes them to the ghosts of these objects. When a patient is examined by the medicine-man, he may affirm that he has the elk disease, the bear disease, the wolf disease, the rattlesnake disease, or the green-snake disease, or he may say that he has the spider disease, or the fly disease. Especially are animals selected as the authors of ailments. I once witnessed the treatment of a child by an Indian shaman who claimed that its ailment was due to a little fossil abundantly found in the carboniferous rocks of Colorado, and known as *Athyris subtilita*. I have many times known colds to be attributed to insects, toothache to be attributed to worms, rheumatism to be attributed to snakes, fevers to be attributed to birds; but on careful examination I have often found that the bodies of these things were not held to be the authors of the mischief, but that their ghosts were the active agencies. Not always can this explanation be obtained, and sometimes the thing itself will be exhibited as having been extracted from the patient; but, in the case of the *Athyris*, the medicine-man claimed to me that, when he extracted the disease from the child, he put the fossil in his mouth before he performed the act of suction by which the ghost was extracted, and that his office consisted in extracting the ghost from the child and returning it again to the body of the fossil.

It may be worth while for me to state how widely prevalent is this doctrine of disease among the North American Indians. I

have found it myself among many of the Shoshonean tribes, which occupy a large area in the western portion of the United States; I have found it among the Wintun of California and many other tribes of the Pacific slope; I have found it also among the tribes of the Gulf states, and have never failed to find instances in any tribe among whom I have made diligent inquiry. Such causes for disease, however abundant they may be, must not be considered to be universal as they appear to the savage mind. The tribes of America rather seem to prefer to ascribe their evils to their enemies within the tribe, or still more often to their enemies in other tribes, when of course they believe in witchcraft. Especially are epidemics imputed to hostile tribes. The theory of the action of their enemies seems to be somewhat of this nature: that the shamans of the enemies have control over disease ghosts. But enough of this phase of the matter here.

In barbarism, which is the upper stage of tribal society, the theory of disease undergoes marked development; not that imputation is abandoned, not that ghosts play a less important role, but that a new group of mythologic beings is developed. These mystic personages are personified phenomena of nature which exist as divine personages, partaking in the affairs of mankind. While the hosts of savage mythology still exist in the popular mind, the leaders lay more stress on the doings of these nature gods. The nature gods are not supposed to be pure spirits, and to have a celestial home where they habitually dwell and where they are organized into a tribe of their own. Now, the same characteristics of imputation are found, the same ghost theory prevails; but in addition there appear a host of nature ghosts which also take part in the affairs of mankind by assuming the shapes of men and representing them on earth. These new deities play a special role in producing diseases among mankind, and their assistance is invoked to prevent and cure disease.

In a higher stage of culture, when tribes are organized as feudal dependencies about city governments which are ruled by

tyrants, and which I have called the monarchical stage of society, there occurs a marked development of the agency of the stars in the affairs of mankind, especially in determining good and evil, and still more especially in determining the state of health and the condition of disease observed on earth. Thus astrology is held to be the ranking science of the world. In this stage diseases are imputed to the stars and to their position, especially at nativity and in other important epochs in the lives of individuals.

Perhaps we have already said enough about the theory of diseases antecedent to scientific medicine. We now must consider briefly the theory of remedies which prevails in the savage, barbaric, and monarchical stages of culture.

In savagery, men find their remedies as they are revealed to them in dreams, ecstasy, hypnotism, intoxication, and even in insanity. In every savage tribe there are particular ceremonies and other means instituted by shamans for the purpose of invoking these aids to diagnosis, and especially of appealing to them for the discovery of remedies. The ceremonies which the medicine-men perform themselves for the discovery of remedies can usually be distinguished from those which they perform over their patients to secure the proper action of their remedies. In the one case ghosts are summoned to reveal the difficulties; in the other case the ghosts are commanded, abjured, begged, threatened, and in various ways induced to leave the body by ceremonial processes. But the shaman, to become such, must first drink his black medicine; he must summon his tutelar ghost by fasting and feasting and by dancing or by long and intense contemplation, by one or another or all of the agencies for opening the portals of ghost-land; and when the gates are ajar he communes with the spirits. Thus medical lore is acquired in these stages of society by dreams, ecstasy, hypnotism, intoxication, and even by insanity.

There are other methods of learning the potency of remedies.

There springs up in savagery a body of occult learning which is a doctrine of signatures, which comes down to the present time. Plants that have red juices act on the blood; plants that have heart-shape leaves act on the heart. In like manner all forms or fancied resemblances of plants and animals have a significance to the shaman as indicative of their medical potency. The world is ransacked to discover these wonderful things which cannot help but reveal their use to the shaman eye.

In early civilization the chemical transmutation of things seems to excite the greatest wonder, which leads to the development of a rude chemistry of transmutation. This new chemistry is alchemy, and the discoveries of astrology are met by the discoveries of alchemy. In this stage of culture, astrology and alchemy prevail as the lore of medical science, which is characterized by the emblems or signatures as they appear in astrology and alchemy. Could we enter into the subject, we could show how the potency of words or the formulæ of expression are now held to be of supreme moment. As poetry is now the fine-art of allegory, so medicine is now the healing art whose lore is taught in allegory. When science comes, the art of medical remedies is emancipated from the art of alchemy, astrology is divorced from diagnosis, and the shaman becomes either a priest on the one hand or a physician on the other. Thus religion and medicine are divorced. But neither religion nor medicine is at once freed from superstition. The progress is slow, and forever there is a war in both departments between science and superstition. How long, oh, how long will it last!

We return now to the consideration of scientific medicine, merely for the purpose of classifying the science, for we are in quest of the evidence by which we desire to exhibit the facts relating to the five properties of matter, and to show that the sciences are legitimately classified by considering the leading properties in a science as the characteristics of that science, and then to see if such classification warrants the conclusion that there are

but five properties of matter, and that in every body these five properties appear.

In medicine we are attempting to show thatthe fund amental property on which the science is founded is consciousness, from which are derived the opinions by which physicians serve their fellow men to secure their welfare. We have tried to show that these opinions require a special study of the metabolism, anatomy, physiology, reproduction, and nervous organization of the human being. In addition to this, there is required a special study of the environment of mankind—the environment of air, water, rocks, plants, and animals, including human beings, by which the individual is surrounded. We might have resolved the immediate environment to more remote conditions in the universe, but have contented ourselves with the immediate or proximate environment, rather for the purpose of showing that it is not necessary to make a final resolution of bodies and relations in order to discover pentalogic elements, although such elements appear whether proximate or ultimate conditions are viewed.

The physician must be informed not only about the conditions of health in these realms of environment, but also the conditions of disease in the same realms, in order that he may properly advise his patient for the benefit of his sanitation, or that he may prescribe those remedies which are best adapted to allay the evil effects of his environment. For this purpose he studies the etiology or cause of disease. He must first study the disease itself in its symptoms, and then discover the origin of the disease in unfavorable conditions. We may pass over the study of symptoms, and the classification of diseases themselves, for here we might antagonize contending pathies. Perchance, if I were quite honest, I would confess my inability to treat the subject as a medical expert. Then the physician must be versed in the causes of disease, and he discovers these causes in air, water, rocks, plants, and animals. Now, we might reclassify these agencies of disease, but the discussion would lead us too far from

our theme, for we are not writing a medical treatise, and it might lead us too far from our knowledge. Then we are immediately led to the discovery of remedies, and here again we strike upon the pentalogic substances which are employed as remedies, and show how substances, forms, forces, causes, and concepts are employed as remedial agencies. Here again we must stop, lest we enter into disputation and show our ignorance.

XUM

EXPLORATION OF ZAPOTECAN TOMBS IN SOUTHERN MEXICO[1]

By MARSHALL H. SAVILLE

During the winter of 1897-'98 the American Museum of Natural History carried on explorations in southern Mexico under the terms of a concession granted by the Mexican government. Having been entrusted with the direction of the work by the President of the Museum, I proceeded to Mexico in October, 1897, and spent several months in Chiapas, in the field of ancient Maya culture, chiefly at the ruins of Palenque. Circumstances compelled me to leave the state of Chiapas, and it was decided advisable to investigate some of the remains of the little-known Zapotecan culture, not far distant from Oaxaca, the capital of the state of the same name.

The city of Oaxaca is situated at the junction of three valleys: to the northwest lies the valley of Etla; to the south the valley of Zachila; while to the east is the valley of Tlacolula, at the extreme eastern limits of which, at a distance of about ten leagues, are located the famous ruins of Mitla. Southwest from the city and not more than a league distant is the range of hills upon which are the remains of the great fortified city known as Monte Alban, which was probably the ancient Zachila, the capital of the old Zapotecan empire.

Tombs at Xoxo—Directly south from Oaxaca, two leagues away, is the little village of Xoxocotlan, in the broad and fertile valley of Zachila. It is occupied by pure-blood Indians speaking the Mixtecan dialect, who cultivate the land surrounding the town, and even the steep eastern slopes and level summit of

[1] This abstract, taken from field notes, is published by permission of the trustees of the American Museum of Natural History, New York.

Monte Alban. Within the limits of the town are several mounds, and from time to time objects of ancient art have been found in the *milpas*, which first called attention to the rich remains in this vicinity. Many of the objects have been obtained by Dr Sologüren, an enthusiastic and intelligent collector in the city of Oaxaca, who possesses the finest private collection of antiquities in Mexico.

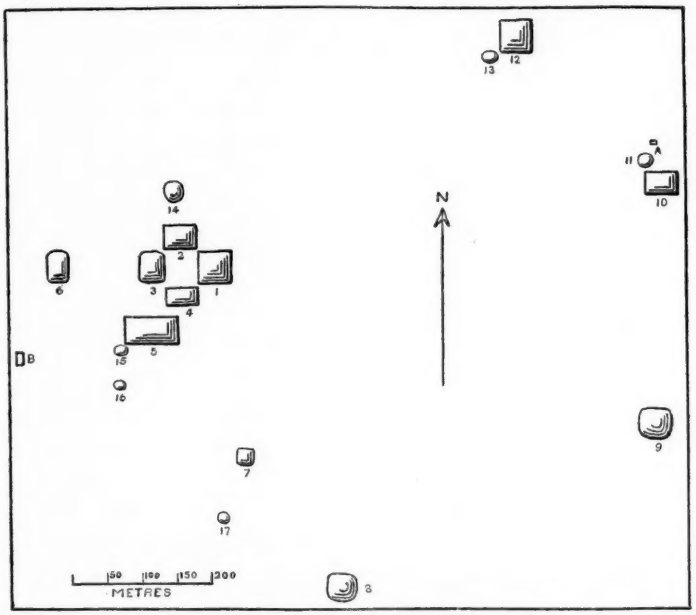


FIG. 8—Plan of Distribution of the Mogotes of Xoxo.

Two miles south of the village is a group of mounds, locally known as the Mogotes of Xoxo, and connected with the main or central group are a number of outlying mounds. (See figure 8.) In 1886 Dr Sologüren made an immense excavation in the center of Mound 5, and discovered a remarkable tomb.[1]

[1] The only account of Dr Sologüren's work which I have seen is that by Dr Ed. Seler, who visited the *mogotes* in company with Mrs Seler in 1888, and published a brief description of the excavation, and a drawing of the front of the tomb, in the

These *mogotes* are mounds of earth, of which there are seven in the principal group; four of these are arranged so as to enclose a large plaza or square, raised a few feet above the level of the surrounding plain. The sides of the *mogotes* are oriented. The eastern and principal mound (No. 1) is a pyramid about 160 feet square and about 60 feet in height. The northern and southern mounds (Nos. 2 and 4) are not so high and are rectangular in shape. Mound 5 has the greatest surface area, and is also of rectangular shape. Mounds numbered 4 and 6 have not the regular outlines of the others, and have been plowed over many times so that their original contour is now obliterated. Of the outlying mounds, Nos. 10 and 12 are of pyramidal form and quite steep, while Nos. 7, 8, and 9 are nearly circular, having been plowed over and their original outlines destroyed. Mound 7, however, at the present time is covered by a number of mesquite and guamuchi trees. Excavations were made in Mounds 1, 3, 4, and 6 of the main group without definite results.

Mound 3—The most extensive excavation was a 15-foot trench through the entire width of Mound 3. Near the top of the mound three terra-cotta cups were unearthed, two being without ornamentation, while the third was in the form of a foot with claws. At a slightly lower depth a small, rudely carved animal's head of stone was encountered, the only detached sculpture found during the excavations. At various depths cement floors and adobe constructions were cut through, and at the bottom of the trench, approximately in the center, several feet below the level of the plain, another cement floor was found, forming a step about 8 inches high with a stone edge. It is very probable that an excavation of the whole mound would reveal a tomb.

Mound 4—In Mound 4 a large cut was also made, and about six feet from the surface there was found a well-executed terra-

Compte-Rendu du Congrès International des Américanistes, Berlin, 1888, pp. 125–131, fig. 33. Dr Antonio Peñafiel reproduced a drawing of the tomb in *Monumentos del Arte Mexicano Antiguo*, tomo 2, pl. 132.

cotta figure representing a human body with a necklace, and having a tiger's head and limbs. This excavation was made from the northern side, about two-thirds of the distance through its width, and down to the level of the plaza. A tunnel was also made in the center about ten feet through hard adobe construction. A curious feature of the mound was revealed a few feet from the surface in the cross-section made by the trench. Three cement floors were found, one above the other and about one foot apart. Almost in the center, from east to west, these floors were found broken, and the northern part more than a foot lower than the southern, showing the whole northern part of the structure to have settled. This was probably due to the action of an earthquake, the region being subject to more or less severe disturbances of this nature.

Mound 5—In this mound the tomb excavated by Dr Sologüren had been nearly covered by earth washed in during the rainy season. Past experience had shown the value of examining tombs which had previously been explored, and in this instance I was rewarded by the discovery of interesting material not reached by the former exploration. This tomb was in the form of a stone chamber about fifteen feet from the top of the mound, and was covered, from the upper part of the roof upward, by adobe constructions. The inner roof was made of nicely dressed flat slabs of stone, laid horizontally. The lintel was a long block of stone, on the outer face of which a fret was painted in red. Above the lintel were stucco decorations, the figure in the center being in the form of a crouching human body with the well-known Zapotecan form of mask. On either side were small heads, one representing an owl and the other a mask-face. Dr Sologüren found five large funeral urns in a row on the roof, just above the stucco figures, of the box-and-cover variety. The door of the tomb was sealed by a large square stone elaborately carved on the outer surface[1]; in front of the

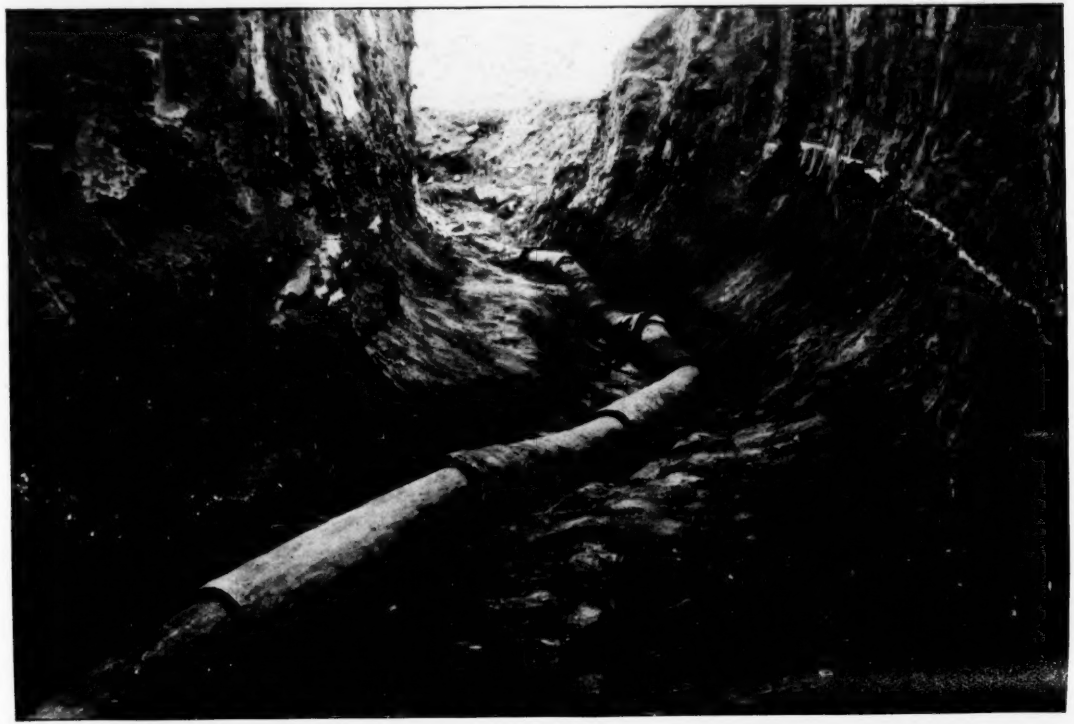
[1] This has been figured by Leopoldo Batres in *Arqueologia Mexicana*, pl. 6, fig. 4.

door was a small enclosure, with two steps leading upward on the sides directly opposite the door. The two side walls, three feet in height, were built against the front wall of the tomb.

It was found that the floor of this enclosure was not reached in the former excavations and that about a foot of hard-packed earth remained undisturbed. It was thickly strewn with objects apparently thrown in during some ceremony; all were covered with vermilion and the earth itself was highly colored.

Many shallow, saucer-like vessels were scattered throughout the enclosure; several small cups with covers and a number of perforated incense burners with hollow handles were dug out, not far from the front wall of the tomb. Fragments of an onyx jar showed traces of a stucco coating on which were painted designs in various colors. Fragments of human skeletons, such as hand- and foot-bones, as well as pieces of human crania, covered with vermilion, were found. In the northwest corner were twenty-six beads made of jadeite and Amazon stone; a number of human teeth had been thrown in, several of which are ornamented by the insertion of a circular piece of hematite, about three-sixteenths of an inch in diameter; several, also, are filed. These decorated teeth are the first that have been found in Oaxaca, but many of the funeral urns have the teeth filed, both in the representations of human faces and in the grotesque serpent masks. Portions of a number of pottery vessels were found on the floor. Dr Sologüren discovered no small objects in the tomb itself. In clearing out the crypt I found the skeleton of a dog, painted rose color, resting on the stone floor near the southeastern corner.

Mound 7—While this work was progressing, two Indians were digging a large hole at the southwestern end of Mound 7 in order to destroy some nests of ants, which were doing great injury to their crops. They discovered at the base of the mound a low stone wall, running east and west, several feet below the surface of their field. Rising from the wall at an angle of



TERRA-COTTA TUBING FOUND LEADING FROM THE CENTER OF MOUND 7, XOXO, DOWN INTO THE FIELD

forty-five degrees was a covering of cement, which, at one time, probably enveloped the mound; it was in the form of an irregular dome with four square sides.

The attention of the Indians was called to a terra-cotta tubing or pipe which ran from under the cement covering, coming downward, and ending a few feet away in the field, perhaps three feet from the surface and ten feet beyond the stone wall. I made an excavation here and followed the tubing upward for thirty-six feet, until it ended near the edge of a cement floor. The character of this singular tube may be seen in plate XXI. It was laid in short sections, of varying length, one end being smaller than the other, the small end of one tube being fitted into the large end of the next. Several of the joints still preserved the cement with which they were made tight. The explorations did not reveal the use of the pipe. I learned from an Indian who has a *milpa* on the summit of Monte Alban, of a single section of tubing which he found in digging in the end of a mound near the eastern part of the ruins, which specimen is now in the collections of the American Museum of Natural History. I was informed by Sr Don Francisco Leon, Director of the Museum in the city of Oaxaca, that sections have also been found by the Indians at Zachila. No such terra-cotta tubing has ever been discovered elsewhere in Mexico, and a new problem is therefore presented. Near one of the sections of the tube was the cover of a beautiful portrait funeral urn, placed with the face upward.

The capping of cement covering the mound was traced upward, and was found to be covered by a foot of earth which has gathered there, and upon which is a growth of mesquite and guamuchi trees. About ten feet from the end of the tube, resting directly on the cement floor at the center of the mound, were five large funeral urns, representing seated figures, placed in a row facing the west. The urn in the center has a remarkably well modeled face, undoubtedly a portrait of some ancient

Zapotecan personage. The two on either side are of the same general size and character, with the exception of the face which is covered with a mask in the form of a grotesque face, possibly the conventionalized serpent, as the bifurcated tongue is one of the most prominent characteristics (plate XXII).

Five feet to the left or westward of the tubing, directly in front of the funeral urns, a curious oven-like structure was encountered, the top being just beneath the cement capping of the mound. We broke into this and found it to be a dome-shape furnace filled with ashes, fragments of rude pottery, large numbers of burnt stones, many adobe bricks burned to a reddish purple color, also several fragments of metates and the handstones for the same. The walls of this oven seem to have been formed by the intense heat to which it had been subjected after being hollowed out of the solid earth and adobe of which the mound was constructed. This burning extended for ten inches and then gradually disappeared. It is probable that this was the kiln in which the funeral urns were fired; possibly others exist in surrounding mounds. Digging eastward, back of the funeral urns, at a distance of five feet, I came upon the front wall of a tomb, in the center of which was a doorway facing the west, sealed by a large, irregular stone. On removing it the chamber was found to be completely filled with earth which had fallen in owing to the destruction of the roof by an earthquake. Upon the roof-stones was a skeleton with several pottery vessels of the same general character as those which were found resting on the floor of the tomb, associated with several human skeletons. The falling of the roof unfortunately caused considerable havoc with the skeletons and pottery vessels, which were in the form of incense burners and pots for household purposes.

Mound 8—After completing the excavation in Mound 7, a trench was started in the center of the western side of Mound 8, and at a distance of fifteen feet from the beginning of the trench I discovered the front wall of another tomb. The door was

TERRA-COTTA FUNERAL URNS FOUND ON CEMENT FLOOR IN FRONT OF TOMB 1, MOUND 7, XOXO

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covered by a large flat stone of irregular shape, and the corners were filled in with broken metates. Above the lintel of the door, in a niche, was a small funeral urn painted red, and the stones around this urn, as well as the lintel and sides of the doorway, were painted the same color (plate XXIII). Just inside the door were a metate and handstone, and, a few inches away, a line of food vessels extending across the chamber. Back of the vessels, near the center of the tomb, was a heap of greatly decayed human bones—the remains of four or five skeletons—which rested on the floor, and at least six inches of earth had silted into the tomb, partly covering the remains found therein.

Another trench was started at the eastern side of this mound, and after working down to the level of the surrounding fields near the center of the mound just back of the tomb, there were found the scattered fragments of what will be, when restored, the largest specimen of terra-cotta ever found in America, and I do not know of so large a specimen ever having been found elsewhere. It represented a warrior, and the different pieces of the figure were scattered over a space of about fifteen feet. The central fragment was the head, upper torso, and right arm, lying face upward; the open mouth revealed the teeth painted white and filed, as in the case of the funeral urns. The eyes were well modeled and painted white and red; the head was covered with a turban of feathers, somewhat resembling the head-dress of Chac Mol, found by Dr Le Plongeon in Yucatan. A closely cropped beard covered the lower portion of the face, the upper part being pitted as though marked by smallpox. The ears had curious circular ornaments pendent by a string passed through holes pierced in the lobes. The nose was ornamented with a long cylindrical bead attached by a string fastened at the top and bottom through the septum. The breast was painted red and white and additionally ornamented with curious designs made by circular indentations. The legs, which lay quite separated from the body, were bare, and the feet were covered with sandals

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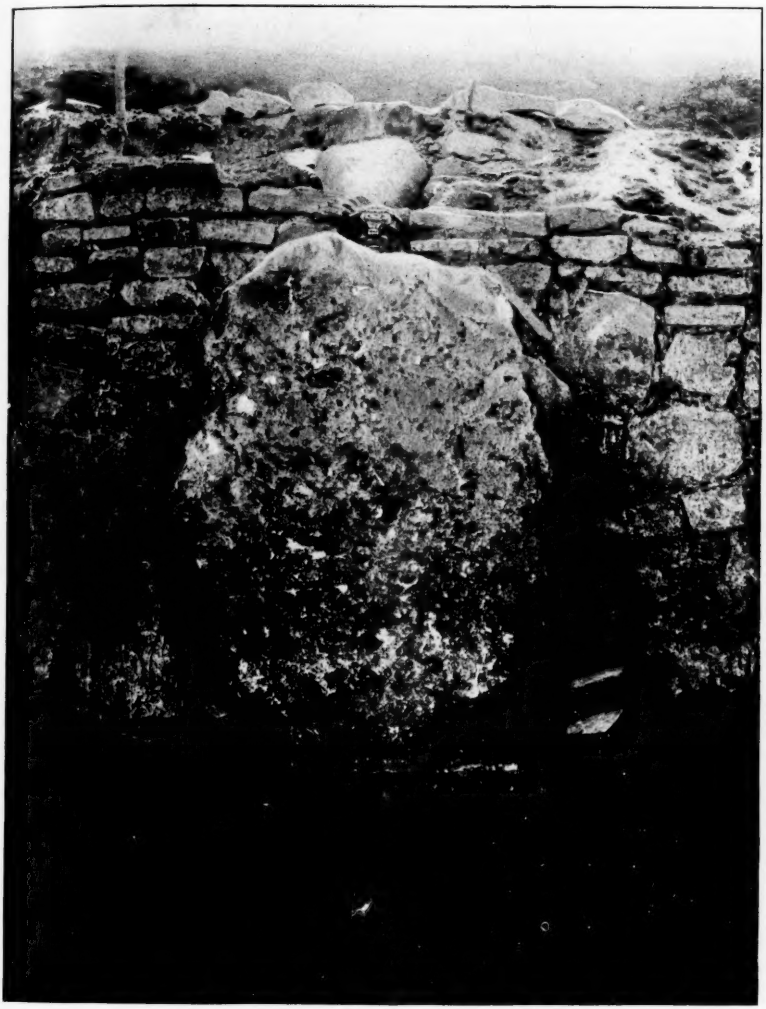
having beautiful heel pieces. Around each ankle was a line of bells. Both the toe- and the finger-nails were painted white; the right arm, bent at an angle, grasped a pole or staff of which about a foot remained. These fragments are now in the Museo Nacional, City of Mexico. The entire length of the figure, according to measurements made of the detached pieces, was nearly, if not quite, six feet.

Mound 9—The most important excavation made at Xoxo was in Mound 9, where a trench was carried through the entire mound. Here were found cement floors and adobe constructions, as in the other mounds. As we worked from the western side of the mound to the center, a number of pottery vessels of different forms were unearthed; these were placed in a manner to indicate that they were thrown in while the mound was being made, probably as mortuary offerings. In one place, a few feet from the surface and beneath the uppermost cement covering of the mound, three human skulls were found in a row, facing the west, each covered with an inverted plate.[1]

A little east of the center of the mound was a flight of stone steps leading down to a cement floor; the upper step was just beneath the cement covering of the mound. A few feet in front of the lower step was the front wall of a chamber, the most important tomb ever found in southern Mexico. The door was sealed with a large stone. The façade of the front wall was in the form of a frame, into which were placed five terra-cotta funeral urns, painted red; on either side of the one in the center was a death's head made of stucco. The face of each urn was protected by being covered with a plate or fragment of a jar, and in one instance with part of a terra-cotta box. These funeral urns, which had been fastened against the wall with cement,

[1] This custom of covering the skull with a plate has recently been described by Mr E. H. Thompson, in his memoir on the ruins of Xkichmook, Yucatan, published by the Field Columbian Museum. He found the skulls in stone chambers or tombs beneath the floors of ruined buildings.



FRONT OF TOMB 2, MOUND 8, XOXO, SHOWING DOOR SEALED WITH LARGE STONE, AND SMALL FUNERAL URN IN THE NICHE OVER THE LINTEL

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were the covers of boxes or chests of terra-cotta, resting on four feet, and the corners of each box were ornamented with symbolic faces. Evidently at the time the tomb was covered with earth, the boxes were thrown in, for I found their fragments in the excavation. On removing the large stone placed against the door, the floor of the crypt was found literally covered with food vessels and incense burners and the remains of several skeletons. The northern part of the floor was raised by the presence of a large slab of stone covering two-thirds of the area. At the inner end, on either side, were niches in the walls, each of which contained human remains. The compartment at the end of the tomb was filled with trunk and limb bones, over which the crania were placed, and all these bones and skulls were painted red. Several pottery vessels and incense burners were placed in front of the bones. Directly below the niches the wall was made by circular stones, one being on either side, and beneath the end niche two were placed side by side.

On the southern wall, just inside the doorway, was a large sculpture representing well-known forms of Zapotecan inscriptions. The walls of the chamber were formerly entirely covered with plaster, but during the lapse of centuries, probably accelerated by the action of earthquakes, the greater part had fallen off. They had been entirely covered with paintings in various bright colors, traces of which are distinctly visible. Over these bright-colored paintings a thin coating of stucco had been laid, upon which, in black outlines, were painted a series of human figures draped in flowing garments, the *tilma* of ancient Mexico. There were also complicated designs, possibly hieroglyphics. Many of the faces of the figures were further ornamented by a thin wash of red paint. The remains of these paintings, were they complete, would be of great value in a comparative study of the old Zapotecan codices.

The most important feature of the tomb was the hieroglyphic inscription carved on the stone door lintel, as giving an entirely

new form of writing from that heretofore known in Mexico, and the first ever found in Zapotecan territory.

In the earth in front of the door were many unadorned incense burners. Near the eastern end of the mound there was found a large funeral urn having the shape of a box with the cover, and resembling those which formed the ornament of the façade. A few feet distant there was encountered a low wall, rising from the top of which, at an angle, was a capping of cement which probably covered the entire structure after it had been completed, in the same manner as the capping formerly covered the tomb in Mound 7. Near the back of the tomb were uncovered a large number of terra-cotta cups, vessels, and small funeral urns, which, when the tomb was erected, had been deposited as offerings and covered with earth.

Tomb 4—In the fields, perhaps a hundred feet north of the large mound (No. 10), the Indians accidentally discovered, during my operations, a large flat stone. Clearing the earth from the edges we found it to be one of the roof-stones of Tomb 4 (A, figure 8), which was not covered by a mound of earth, but had been made by excavating several feet downward in the level field. It was covered by a cement capping which seemed to extend outward in all directions. The vault was long and was sealed by a large stone, in front of which was a small compartment with stone steps leading downward, as in Mounds 5 and 9. The roof had fallen in, and no remains of any kind were found in the excavation. The doorway faced the west.

West of Mound 3, in which the first excavations were made, was a large, low mound (No. 6) which I nearly demolished. A few inches below the level of the surrounding field was a cement floor, and in the general digging the remains of earthenware vessels and a few red-painted fragments of a human skeleton were taken out.

Several other experimental excavations were made with more or less negative results. One of these trenches, however, brought

to light a very interesting feature in the discovery of a house site. This excavation (B, figure 8) was made in the open field at a short distance from the main group. Several feet below the surface was a cement floor upon which was a raised platform of cement with a faced edge of cut stone. There was not sufficient time to complete this excavation, nor even to extend it as I had wished, but it was evidently the foundation of a dwelling, and it indicates the great amount of work necessary in order to thoroughly explore the remains of Xoxo alone.

Excavations in Mounds 10 and 12 would unquestionably bring to light tombs of perhaps greater interest and importance than those already discovered.

Conclusions

Summarizing in a general way the results of the explorations, the following facts are brought out:

1. The mounds of this group are burial mounds, containing stone vaults, the doorways of which face the west and are sealed by large stones.

2. Funeral urns are placed in series of five in front of the tombs, on the roof, or fastened into the façade.

3. These vaults are properly ossuaries or places where the bones of the dead were deposited. Tombs exist in Xoxo outside of the burial mounds. House sites may be looked for in the vicinity of the main group. The absence of stone implements is notable, only a single tiny arrowpoint and two celts being found.

4. The mortuary custom of painting the bones red, the placing of food and incense in the tomb, the interment of decapitated heads, the sparsity of personal ornaments buried with the dead, and the absence of decorated vessels in the vaults, are features brought out by these explorations.

5. The custom of filing and inlaying the teeth was practiced, and the use of hematite as an inlay was found for the first time.

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This ancient custom can now be traced from the Pueblo region of Arizona to southern Central America.

6. The terra-cotta tubing found in the mound may perhaps be explained as serving some mythological purpose—perhaps to form an outlet for the escape of the shade of the dead. This explanation, however, is not altogether satisfactory, and further excavation in this region is needed to shed light on its significance.

7. The great importance attached to mortuary rites is shown by the elaborately constructed tombs containing mural paintings and hieroglyphic inscriptions. The terra-cotta figures and the funeral urns attest the very high attainment of the ancient Zapotecas in the art of modeling earthen objects.

8. The absence of anything like mosaic carving or patterns in the walls, such as are found in Mitla, is of great interest; furthermore, the mural paintings of Xoxo are widely different from those of Mitla. The excavations give additional proof that the ancient palaces of Mitla are not to be attributed to Zapotecan culture, but are the remains of a city built by the great Nahuatl tribe. This is further rendered probable by the fact that the character of the paintings of Mitla and those of the ruins of San Juan Teotihuacan, in the valley of Mexico, are practically identical. The tombs of Mitla, like the palaces, are constructed with walls having mosaic patterns.

The valleys of Oaxaca, Etla, and Zachila contain many groups similar to those of Xoxo, and of far greater extent; and as my work in Xoxo reveals a tomb of different character in each mound that was excavated, it is extremely probable that a great variety of new material for the study of Zapotecan culture will be brought to light by further explorations carried on in this territory.

STONE HAMMERS OR PESTLES OF THE NORTHWEST COAST OF AMERICA

By HARLAN I. SMITH

The stone hammers or pestles of the northwest coast of America represent a variety of types of peculiar distribution. An examination of the specimens in the American Museum of Natural History, New York, reveals the following facts:

The different types of these hammers have many features in common. Their use for driving wedges causes many of them to have concave bases, while those used for rubbing have become but slightly convex on this surface. They usually have a well-defined head, which in general is cylindrical, and extends some

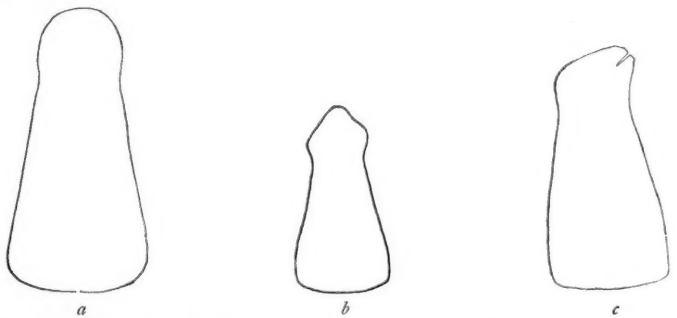

FIG. 9—Forms of hammers or pestles from Thompson river valley, British Columbia. *a*, No. 16-2416, Kamloops; *b*, No. 16-2537, Kamloops; *c*, No. 16-2870, Spence's Bridge. (One-fourth nat.)

distance up from the base (figure 10). Rarely the body meets the base without such a head, except in those cases where the body is bulging (figure 9), instead of flaring toward the base (figure 12).

Each variety, so far as we know, may be assigned to a particular region. In the specimens from the valleys of Thompson river

and the upper Columbia (near Spokane) the body is conoid in shape, as shown in figure 9, *a*. The top is sometimes made in the form of a face or animal head (figure 9, *c*); frequently it is of hat-shape, as shown in figure 9, *b*.

In the valley of Fraser river, near Lytton, British Columbia, there is a type with a well-defined cylindrical head, larger than

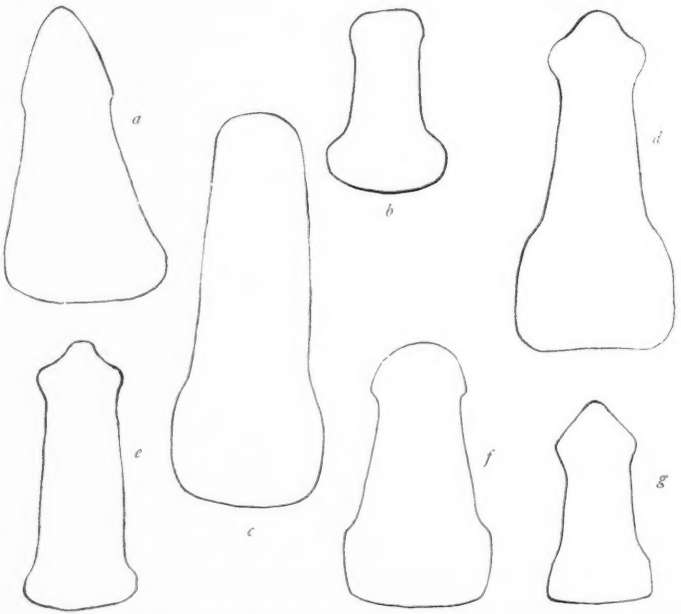

FIG. 10—Forms of hammers or pestles from Lytton, B. C. *a*, No. 16-2908; *b*, No. 16-3221; *c*, No. 16-3222; *d*, No. 16-2904; *e*, No. 16-2958; *f*, No. 16-2907; *g*, No. 16-2906. (One-fourth nat.)

the tapering body, the sides of which meet the base at nearly right angles, as in figure 10, *d–g*. The prevailing form of knob at the top of the handle of this type resembles that of the Thompson valley type (figure 9, *b*), and it occurs also in Alaska. At Lytton is also found a conoid knob at the top of the handle (figure 10, *a*). Another hammer of this form (figure 11, *a*) has been found in the delta of Fraser river. In that region, however, many

types are in evidence, as one might expect, if it were visited by many tribes in the past, as it is at present.

On the western and northern parts of Vancouver island, the typical form of hammer is provided with a head at each end, the faces of which are nearly parallel, and the upper and lower ends somewhat alike, except that the latter is larger (figure 11, *b*, *c*).

In Alaska there are two types, one resembling the form found at Lytton, save that it is much more slender and tapering (figure 12), and the other having a handle like a flatiron, saw, or paddle

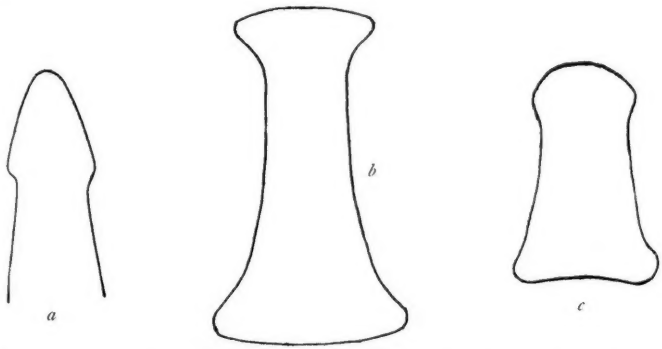

FIG. 11—Forms of hammers or pestles from British Columbia. *a*, Fragment from Eburne, Fraser river delta, No. 16-5298; *b*, from Clayoquath, Vancouver island, No. 16-2124; *c*, from Fort Rupert, Vancouver island, No. 16-2226. (One-fourth nat.)

(figure 13). This type has a very short body, which resembles the head of the other types, and which might well be called a head, were we able to consider the body suppressed. The practically cylindrical body, which does not appreciably taper or flare, meets the slightly convex or concave base at nearly right angles, and never with a sharp, acute angle. Except in one case (figure 13, *c*) I have not seen a marked line between the body and the handle, the ends of which, in some cases, are ornamented with notches or human faces in relief. These hammers seem to have been used for rubbing as well as for pounding.

Specimens of the types found in the valley of Thompson river, at Lytton, and in lower Fraser valley, have been found in graves

not associated with evidences of contact with civilization, and accompanied with chipped stone arrowpoints and other things which indicate that they were made prior to such contact. Sev-

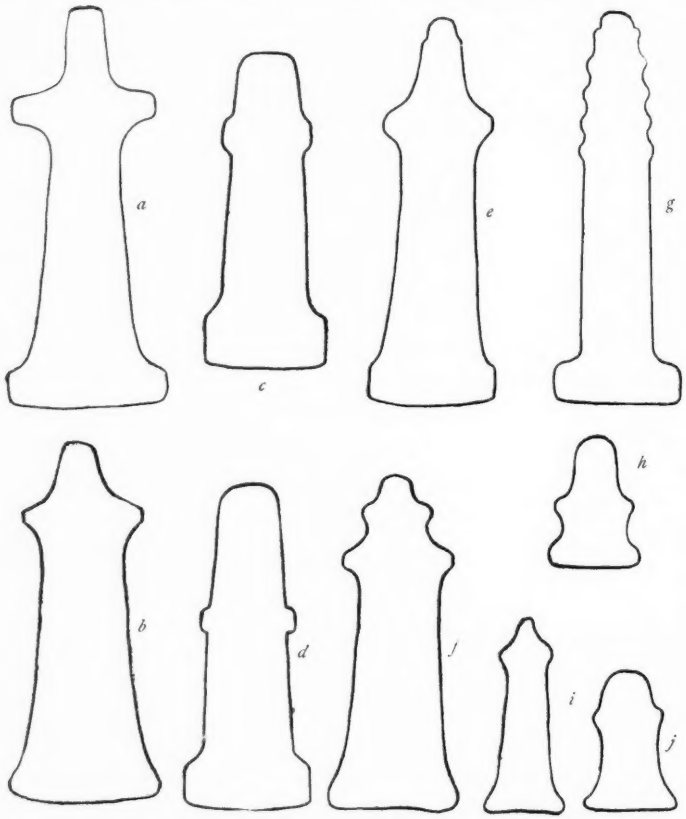

FIG. 12—Forms of hammers or pestles from Alaska. *a*, Prince of Wales island, No. E–53; *b*, Sitka, No. E–31; *c*, Yakutat, No. E–94; *d*, Chilcat, No. E–44; *e*, Chilcat, No. E–35; *f*, Sitka, No. 19–70; *g*, Chilcat, No. 19–88; *h*, Fort Wrangel, No. E–20; *i*, Sitka, No. 19–73; *j*, Auk, No. 19–74. (One-fourth nat.)

eral were found in a shell-heap in the delta of Fraser river, at considerable depth below many undisturbed shell-layers, over which was a stump of a Douglas fir more than six feet in diameter.

The curious handles of the Alaskan type—resembling those of

paddles, saws, and native adzes—are such as convenience might suggest. Since these hammers have many features in common with the prehistoric hammers of the northwest coast, the special-

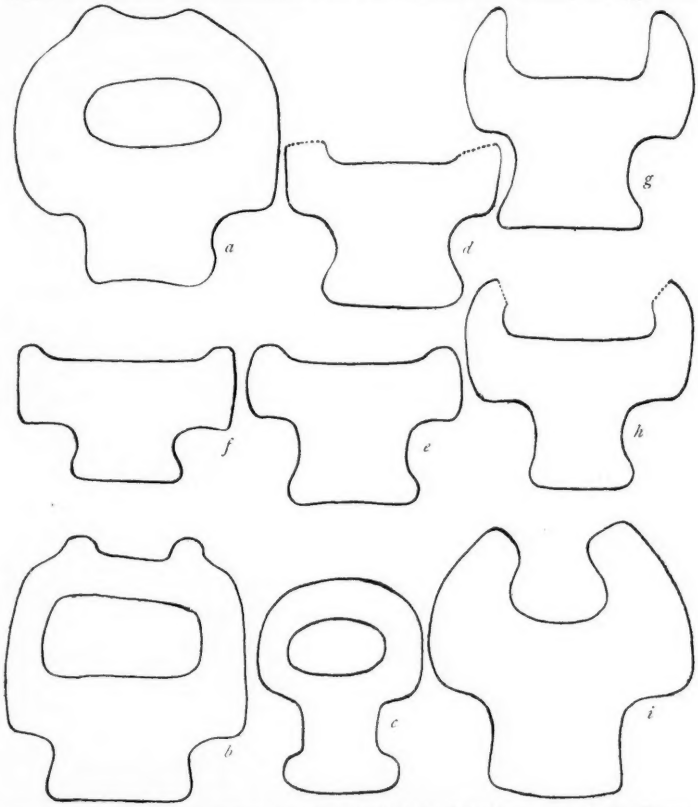

FIG. 13—Forms of hammers or pestles from Alaska and British Columbia. *a*, Angoon, No. E–1945; *b*, Prince of Wales island, No. E–48; *c*, Stickeen river, No. 19–59; *d*, Juneau, No. E–25; *e*, Takoo, No. E–47; *f*, Yakutat, No. E–94; *g*, Northern British Columbia, No. 16–164; *h*, Juneau, No. E–24; *i*, Tongass, No. E–1318. (One-fourth nat.)

ization of the handle does not seem to be sufficient reason for differentiating this form from the others. If this form of hammer were introduced from the Hawaiian islands,[1] as Professor Mason sug-

[1] In vol. I, No. 1, p. 9, of the *Occasional Papers of the Bernice Pauahi Bishop Museum*, Honolulu, the specimens to which Professor Mason refers are described as coming from the Society islands.

gests,[1] it might be expected that it would not present so many differences from the *poi* pounders, and so many similarities to the three types of hammers described above and known to be old in America.

All the *poi* pounders that have thus far been brought to my attention, have very convex bases and no heads (figure 14). The bodies are slender, and always flare to meet the base with a very acute angle, forming an implement of bell shape. In this respect they resemble some Ohio and Kentucky pestles as much as they do those from Alaska. The handles resemble paddle-handles, but are much more graceful. A considerable variety of forms is found in certain groups of islands of the Pacific.[2]

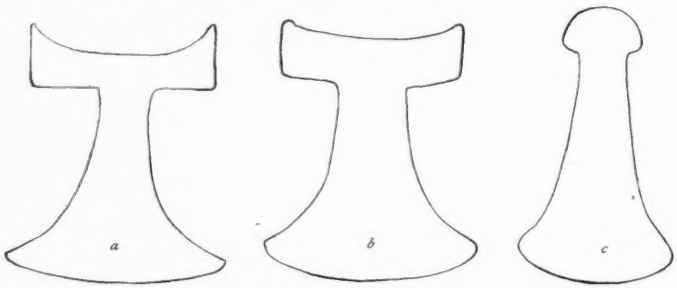

FIG. 14—Forms of hammers or pestles from the Hawaiian islands (?). *a*, No. S–5220; *b*, No. S–5219; *c*, No. S–5221. (One-fourth nat.)

Although the surfaces of some of the Alaskan hammers are disintegrated, and appear very old, yet it will be important to note if this form is discovered, as the three mentioned types have been, under circumstances that prove it beyond dispute to have been made before contact with white people. It seems hardly credible that the vast number of these curiously handled specimens, each of which required much patient labor, should have been made within the short period since Russian colonization; and we look forward with interest to more definite information on the subject.

[1] *American Anthropologist*, vol. XI, p. 382.

[2] Gill, *Life in the Southern Isles*, p. 204. Wilkes, *Exploring Expedition*, vol. IV, p. 48. Finsch, *Ethnologische Erfahrungen*, pp. 206, 329.

ANTHROPOLOGIC LITERATURE

Die Sprache der Zimshian-Indianer in Nordwest-America. Von Dr A. C. Graf von der Schulenburg. Braunschweig: 1894. 4°, 372 pp.

Dr von der Schulenburg has undertaken the laborious task of compiling a grammar of the Zimshian (Tsimshian) language from the translation of the Gospel made by Bishop Ridley. Anyone who has undertaken to study a language from material of this character will appreciate the labor involved in the task and the numerous sources of error that obscure the structure of the language. The translations, which are generally, as in this case, made with the assistance of somewhat educated natives, are never free from error, and often are inconsistent in the phonetic rendering or morphological interpretation of grammatical phenomena. It requires, therefore, an extraordinary degree of judgment and of caution to reach satisfactory results. While the present work bears all the marks of most painstaking industry, the author has not succeeded in overcoming the difficulties of grammatic interpretation. He has left his analysis so incomplete that the characteristic features of the structure of the language do not appear with sufficient clearness.

A discussion of the morphology of the language would require, first of all, an explanation of the fundamental morphological processes —reduplication, and word formation by means of prefixes and suffixes. The tendency to form words by means of prefixes is one of the most characteristic features of Tsimshian. Dr von der Schulenburg, unfortunately, has been misled by the lack of consistency in printing, prefixes often being represented as parts of words, often as independent words. He has accordingly treated the same subject in one place as a dependent prefix, in another as an independent word, thus creating a great deal of confusion in the simple structure of the language. Neither has he made an analysis of the functions of prefixes. It would seem that we may distinguish nominal and verbal prefixes. Purely nominal prefixes are either locative or adjective; or they transform verbs into nouns, such as prefixes for the *nomen actoris*, etc. Purely verbal prefixes are either prepositional or adverbial; or they transform nouns into verbs. One of the most striking features in the use of these

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prefixes is the use of pairs of prepositional verbal and locative nominal prefixes; for instance, *ludhat gishga zumtemplega*, "he was in the temple" (*lu-*, in; *dha*, to be; *-t*, he; *gishga*, preposition; *zum-*, interior of; *temple*, temple; *-ga*, absence). Here *lu-* and *zum-* form a pair of prefixes. Another pair are *le-* (verbal prefix), on; *lak-* (nominal prefix), surface, top of. A number of very special ideas are expressed by means of prefixes; such as, stopping a motion, in darkness, actions done while in motion. Prepositional prefixes which merge into local adverbial prefixes are highly developed: on, in, towards, around, up, down, towards sea, inland, up river, down river, against. Some of these show nice differentiation of meaning: upward and downward along the ground, upward and downward in the air, into and out of from the side, into and out of from the top. Most of these shades of meaning have not been recognized by the author. The following translations of prefixes require corrections: p. 56, *klthna-*, prone; p. 57, *klthum-*, around an obstacle; p. 57, *bak-*, upward along ground; *man-*, upward through the air; p. 58, *tiki-*, down through the air; p. 59, *lthim-*, stopping a motion; p. 60, *ta-* (only in plural), extreme; p. 67, *gul-*; the examples given here mean partly *gul-*, empty (*gulwalp*, house without inhabitants), partly *tkul-*, against; p. 68, *gwan-*, near; p. 70, *ksh-*, extreme; p. 72, *ōksh-*, out of from top. Here belong also the prefixes enumerated on p. 7, and many of those on pp. 84 ff., such as *gup-*, really; *shin-*, about; *lugwil-*, for good; *shim-*, much, very, real; *wi-*, great; p. 87, *zilum-*, into from the side; *logum-*, into from top; *yaga-*, down along ground (see above, *tiki-*); p. 88, *haldum-*; *agwi-*, outside; *zinsh-*, deserted; p. 91, *altha-*, in the dark; *hashba-*, already; p. 92, *lugwil-*, for good (see p. 85); p. 94, *gidi-*, right there; *shidi-*, often; p. 95, *alu-*, publicly; p. 97, *naga-*, each other; p. 98, *zum-*, in; *lak-*, on.

A number of so-called "formatives" which the author enumerates in this chapter are actually substantives; *e. g.*, *zagash*, along, which evidently means, edge of; *hazaklthk*, in front of; *lakau*, top of; *hagau*, place behind; *tkulan*, place behind; *awa*, proximity; *adup*, place opposite; *miyan* (p. 104), foot of tree. In short, in the chapter on formatives the most heterogeneous subjects are thrown together; and prefixes which belong together have been separated, so that the function of the prefix in the structure of the language is greatly obscured. Nor do we find any mention of the tendency of the language to form compound words embracing a whole group of prefixes: *shimalthalutikidoulth*, really to go down inside in the dark.

The function of reduplication is not set forth in full, except insofar as it relates to the formation of plurals. From an examination of the

examples given by von der Schulenburg, it would seem that reduplication does not form real plurals, but much rather distributives, as is the case in many American languages. Therefore we find it used for the frequentative of the verb, the simulative, and with the prefix indicating actions done while the subject is in motion. The phonetic laws underlying reduplication are not stated in the grammar, probably because Bishop Ridley's method of spelling does not bring out the fundamental fact of the existence of a hiatus between the reduplicated syllables and the stem. The principle of reduplication consists in the repetition of the whole word with shortened vowel up to the first consonant following the first vowel inclusive. Von der Schulenburg's "reduplication of last syllable" does not exist, but can be shown to be regular reduplication. While the number of classes of words that form the plural in various manners may be somewhat simplified, the whole subject of formation of plural is perhaps the most satisfactory in the whole book.

In the difficult chapter on the verb, the author does not show any very clear insight into the structure of the verb in American languages. The great paucity of tenses is striking, but the existence of a well-developed passive and the use of passives of transitive verbs for intransitive verbs, would have required much fuller treatment. But our principal criticism is directed against the treatment of the incorporated pronoun. There are two forms,—a suffixed form 1st p. s. *–ū*, 2d p. s. *–un*, 3d p. s. *–t*; 1st p. pl. *–m*, 2d p. pl. *–shim*, 3d p. pl. *–det*, and another consisting of prefixes: 1st p. s. *na–*, 2d p. s. *ma–*, 3d p. s. *t–*; 1st p. pl. *dup–*, 2d p. pl. *mashim–*. Even if the author was not able to find a clew to the significance of the two sets of forms, their existence and occurrence ought to have been explained. It would seem that the second form has a demonstrative significance, but the subject is not clear by any means.

The language has a strong tendency to indicate in verb, noun, and preposition the location of the action as visible or invisible, the former by the sound *d*, the latter by *g*. Von der Schulenburg uses for these forms the somewhat unfortunate term "article," while they would much more properly be called "demonstrative affixes." Particularly the preposition *a* has the tendency to take *d* or *g* as prefix, according to the location of the event. The last word of a sentence, or the verb very often, takes the suffix *da* or *ga*, indicating presence or absence; these, while phonetically identical with the preposition mentioned before, are purely demonstrative, and of a quite different origin. It is not correct to treat both as identical. The word *t'in* is also called an article by the author, who thinks that it indicates persons who take part in an action

or witness an event. It seems that the word is generally best translated by the relative pronoun, and I am inclined to believe that it is a verbal noun with prefixed third person singular. In the reflexive pronoun the author does not distinguish the subjective form *lip* and the objective form *geluksh*.

One of the most peculiar features of the Tsimshian language is the use of connective suffixes for indicating the syntactical relation of parts of a sentence. There are two of these: *-sh* indicating the connection of the preceding part of the sentence with a proper noun, a term of relationship, or an independent pronoun, and *-lth*, indicating the connection with all other classes of substantives or pronouns. The incorporation of the pronominal object, which in many American languages forms the basis of the sentence, is only slightly developed in Tsimshian. The connective suffixes perform the function of this incorporation. The verb, which generally precedes the subject, takes the connective in order to indicate its relation to the subject. Prepositions, conjunctions, numerals, also take it; but adjectives, adverbs, and genitives that are not possessives or partitives take the connective suffix *-um*.

The second part of the book is taken up by a vocabulary, which is very inconveniently arranged, so that it is all but impossible to find the words that are etymologically connected. Furthermore, varieties of sounds that in the texts are distinguished by diacritical marks are arranged promiscuously. I add a few corrections to the vocabulary:

p. 202. *aiwāl*, long time.
p. 203. *shaakshīyā*, to cause to increase.
ltha a'akshīyāouqushga zīūshtaga, when the daylight increased.
sha'alashgwish, to make weak.
algumgau, to walk sideways.
p. 204. *alīshk*, *hardly*.
p. 205. *amgaul* for *gamgaul*, only one.
p. 206. *lɛbɛo'n*, wrist.
ât, cover, enveloping an object.
p. 207. *awilmagat*, "making all right."
p. 208. *babaguntk*, to deny.
p. 209. *bīāk-*, to tear.
p. 210. *boyin*, take care!
p. 211. *whagumdak*, disgraceful.
dalb-, to shrink.
p. 212. *dalgaulshk*, to ponder over something.
shadalth, to throw away.
dap, to measure.
p. 213. *dāpkunshk*, nail.
p. 214. *desh*, guts of bear.
dhōdhō, to sweep (pl.).
p. 215. *dibā*, to run away with.
dō, see *dhō*, to sweep.
p. 217. *mandukīāgw-*, to hold up.
duphaitk, short.
p. 218. *zilumgā*, to take into.
p. 219. *gabakshk*, to kick.
gaboga, cirrus clouds = cockleshells of sky.
gagaï'in, to be sleepy.
p. 221. *gakhashīepk*, epidemic; *k-k*, accident.
p. 222. *gāmuksh*, cape, made of wool of mountain goat.
g''aphā'yetk, to blame = to turn over a long thing.
gashbagwulthkzhū, to go out about astray: *gashba-*, astray; *gwulth-*, about.
gashbashawāl, to act without

knowing what one does.
p. 223. *wale*, to carry on back.
p. 224. *gaubunum yōta*, an eater; from *gaub*, uvula.
p. 225. *gauksh*, maple.
p. 226. *gaum*, soft.
p. 228. *giaksh*, calm.
p. 229. *whanahôkshgum giat*, a pure man.
p. 230. *hūkgagigīaushk*, man who is very particular.
p. 231. *gīiza*, almost.
gikgizau'unt, rear of home.
p. 232. *gishgeshgum gagaud*, jealous.
gishiyā, to inherit, to go from one to another.
gishwun, to transplant.
gītk, raised.
p. 233. *gol*, to fall and break.
p. 234. *gouwilg*, wound around.
p. 236. *gulamīān*, not to get what one wants.
guldau, away from the village, in the woods.
gulīamuksh, to strew.
gulthaudak, to sip.
p. 238. *gunōtk*, week, Sunday = well-dressed.
p. 240. *gwashau*, pig (Chinook: *cochon*).
p. 241. *gwilthgok*, to nod with the head.
gwishtīyam, to lend on interest.
gwunuksh āmtk, pretense to be good.
p. 243. *hagimuk-zaltk*, towel = to wipe face with.
hagwilō, rope.
p. 244. *hāk*, difficult.
p. 245. *haldāo-*, to be bewitched.
halīmga, sing: *hagyī'mga*, to wipe with.
halthau, calico.
mɛg'âqs, salmon berries.
p. 246. *shūbashum hanāk*, young girl.
hanwilāgw-, to destroy.
hat'ā'qs, pole for canoe.
hathaudak, to boil.
p. 247. *hēkul*, to persist.
p. 248. *hīdō*, report.
p. 253. *k·ā'maks*, cape, worn in rainy weather.
p. 254. *kbīsh*, box (?).
puksh (instead of *kbūksh*).
p. 255. *klām*, to become inebriated: *k-*, to eat; *lām*, rum.
klthinoush, tin.
klthipdalthdalth, split all over.
p. 256. *kshadōmuksh*, to squeeze out.
kshalthwailukshish, water mixed with something else.
kshashīshiksh, to pull out.
p. 257. *kshīāshk*, came out of.
p. 258. *kwana'ks*, spring of water.
p. 259. *kzadamsh*, to squeeze in middle.
kzinsh zagush, to inherit = to take what is left over by death.
la'abel, at once.
la'āk, starvation.
lag, needle.
lahēl, to stop, v. a.
p. 261. *lakshintk*, to wash all over.
lālt, snake.
p. 262. *laulok*, rotten.
les'iā'n, a boil.
p. 271. *ma'ol*, epileptic fits = like bear.
p. 272. *milthitk*, green = like leaf.
mawaza, foolish = like land otter.
p. 273. *mīhoksh*, sweet-smelling.
p. 274. *mishmūsh*, cow (Chinook).

FRANZ BOAS.

The Play of Animals. By KARL GROOS. Translated with the Author's Coöperation by ELIZABETH L. BALDWIN. With a Preface and an Appendix by J. MARK BALDWIN. New York: D. Appleton and Company, 1898. 12°, xxvi, 341 pp.

Although not nominally anthropologic, this work is of much interest to anthropologists; for man is preëminently *the* playing animal, and the

development of one of his most significant aspects can be traced only through the investigation of play among lower animals. One of Professor Groos's chapters—"The Psychology of Animal Play"—indeed indicates clearly the connection of his subject with attributes attaining their best development only in the culminating form of the animal realm. The first chapter is a critique of the surplus-energy theory of play, commonly ascribed to Herbert Spencer, though the author attributes its origin to Schiller and credits Spencer only with its elaboration; the theory is discussed trenchantly and finally dismissed as unsatisfactory. Then comes a constructive chapter entitled "Play and Instinct," in which the author's special views are propounded and discussed with reference to the inquiries of others and to the conspicuous facts of animal conduct. Next follow two arbitrarily separated chapters on "The Play of Animals" in which a wealth of original and secondhand observation is assembled in such manner as to harmonize with, and strongly support, the author's conclusion. This conclusion may be summed briefly, yet perhaps fairly, in the statement that play is instinctive and prophetic — or, expressed in other terms, that play is a spontaneous expression of hereditary faculty which eventually attains full development in the individual through continued exercise. The fifth chapter (already noted as of special interest to the anthropologist) presents the mental aspects of animal play, explains the preponderance of play in youth, and compares the playful exuberance of animals and man in such manner as to set forth their relations. The rendering into English seems to be admirable, while the value of the work is enhanced by the preface and appendix contributed by one of our foremost psychologists. The book-making is modest but excellent.

To the reviewer, the work of both author and editor seems highly commendable, and the results, so far as they go, quite acceptable; he would differ only in extending the conclusions further and expressing them more emphatically as a necessary part of the present fabric of science. In an address delivered nearly five years ago, he seriated the developmental stages of vitality, under somewhat arbitrary definitions, yet in such manner as to show that spontaneous action necessarily precedes maturely developed function.[1] This is true of everyday human activity, in which men *do* before framing rules of doing; it is true also of the animal realm in which, as Professor Groos so fully demonstrates, play presages the prosaic functions of mature existence; it is equally true in the vegetal realm, in which the tree springs upward before its form is shaped and its tissue conditioned by wind and

[1] *The Earth the Home of Man.* Anthropological Society of Washington; Special Papers, 2, pp. 3–5.

sun and environing organisms; and it is no less true of the mineral realm, in which affinity precedes combination. In a more recent address he took occasion to define activities in a certain order, and to indicate some of the reasons for regarding this order as normal and necessary, pointing out that "the primary activities of mankind [both ontogenetic and phylogenetic, and presupposing the antecedent organic development] are connected with more or less spontaneous sensations of pleasurable character."[1] Others have contributed to the subject, both before and since the issue of these addresses. Contributions of the first magnitude have been made by Powell in various publications, particularly in his recent epistemology,[2] in which the spontaneity of all primary action is not only recognized in the mineral, vegetal, and intellectual realms, as well as in that of animals, but is traced to fundamental principles; while the relations are explained by his rendering of the law of the persistence of motion—a rendering by which it becomes virtually a law of cosmic kinesis, illumining natural processes of every grade from chemic union to psychic action. It may be noted further that for some years the researches of the Bureau of American Ethnology have rested on a classification of the humanities in which the nascency of pleasurable activity is fully recognized. In this classification it is postulated, even more definitely than in the table with which Professor Groos closes his book (page 328), that those original and spontaneous functions which arise in play and mature in fine arts give character to the primary science of human activities, or esthetology; and the classification goes much farther than that of Groos's tabulation in seriating the several activities maturing in (1) arts (including play and sports in their various forms), (2) industries, (3) institutions, (4) languages, and (5) opinions (including myths, beliefs, and philosophic systems).[3] This statement concerning the extension and application of the principles formulated by Professor Groos is not designed as criticism, but is intended chiefly to indicate the soundness of his work and the strength of his position; at the same time it opens the way for an expression of high appreciation of the able manner in which he has brought together invaluable observations and records. His work is in the direct line of scientific progress, and marks a degree of advancement highly gratifying to his fellow-students.

W J McGee.

[1] *The Science of Humanity* (*Proceedings of the American Association for the Advancement of Science*, Salem, 1898, p. 315. *The American Anthropologist*, vol. x, No. 8, August, 1897, p. 241. *Science*, vol. vi, n. s, No. 142, September 17, 1897, p. 213).

[2] *Truth and Error, or the Science of Intellection*; Chicago, 1898.

[3] *Fifteenth Annual Report of the Bureau of American Ethnology* for 1893–'94, 1897, p. xix. *Sixteenth Annual Report of the Bureau of American Ethnology* for 1894–'95, 1897, pp. xvi-xviii.

Wild Animals I Have Known and 200 Drawings. Being the Personal Histories of Lobo, Silverspot, Raggylug, Bingo, The Springfield Fox, The Pacing Mustang, Wully, and Redruff. By ERNEST SETON THOMPSON. New York: Charles Scribner's Sons, 1898. 8°, 358 pp., 30 pl.

At first sight this highly artistic book might seem even less germane to anthropology than the recent treatise by Professor Groos; yet on careful perusal it is found to deal, on nearly every page, with characteristics shared by lower animals and men—especially men of the lower culture-grades. Mr Thompson is a naturalist, as his record shows, an artist of notable strength and facility, as his effective picturing proves, and a writer of ability and skill (not to say genius), as his vivid and lucid sentences and the delicately woven web of each of his chapters testify eloquently; more than this, he has the instinct of the voyageur, the trapper, the shepherd, and the mahout for divining the hardly scrutable workings of the animal mind and sympathizing with their simple but strong emotions and passions; and perhaps above all else, he has the faculty of coördinating his singularly acute observations on animal activities in such fashion as to define the esthetic and industrial and social features of animality, much as the features might be defined by the animals themselves were they but able occasionally to reach the higher view-point and scan therefrom the lower plane of their actual existence. The book indeed is a revelation; it opens new vistas into cloudy commonplaces, investing long-neglected facts of everyday observation with new interest, and vitalizing the dull body of systematic (but purblind) notes on our bestial neighbors. The book is more than attractive reading merely; it compels recognition of the great fact that lower animals possess definite social attributes—that collective units exist among the beasts no less than among men. The animals studied by Mr Thompson had their collective arts—not only their youthful sports and gambols, but their more deeply studied comedies, often trembling on the grim verge of that tragedy on which the curtain always falls at last, for such is the law of the animal realm; they also had their industries, normally collective among the individuals of a group, only abnormally solitary; they had their social organization, in which craft and cunning, often combined with physical strength and grace, marked the leadership; they had their language, not only of voice and gesture but of lepine tree-mark and canine scent-record which their own kind and even some aliens might interpret; they had their system of education and occult discrimination and magnification of evil—in short, Thompson's birds and quadrupeds, biotic

organisms of the systematic zoölogist as they were, lived demotic lives just as do human savages and subjects and citizens. To the anthropologist the eight biographies of the book are of deep interest as showing the beginnings of demotic characters below the plane of humanity; they are of still profounder interest as indices of the way in which the human activities must have begun. Groos deals seriously with the lighter class of activities almost alone; Thompson treats not only of play but of work, in all its protean aspects, in luminously instructive fashion, albeit in lighter vein. The book is elegant in technique, excellent in paper and print, and exquisitely illustrated by plates and abundant marginal cuts. There is no index. W J McGEE.

Creation Myths of Primitive America in Relation to the Religious History and Mental Development of Mankind, by JEREMIAH CURTIN. Boston: Little, Brown, & Co., 1898. 8°, xxxix, 532 pp., pl.

These tales, with which we were already familiar in the columns of the *New York Sun*, are now presented to us in the form of a handsome octavo. There are twenty-two altogether; thirteen of these were collected from the nearly extinct Yana, and nine from the Wintu, tribes of northern California. They are all interesting and instructive, and bear evidence of having been received from good aboriginal authorities. The only trace of European influence is found in the occasional use of English terms of measure, such as miles, hours, and bushels. But it is difficult for an Indian who knows the significance of these terms to avoid using them, since the native modes of conveying the same ideas involve much circumlocution. The author does not tell us the names or character of his informants, but we conjecture that the stories were told by Indians who spoke English.

It is feared that the title may prove misleading to many. We personally do not object to the expression "Creation Myths" in this connection; but it will not meet with the approval of those who define "create" as "to form out of nothing," or of those who see in the first chapter of Genesis a standard tale of creation. Creation is a long process, not yet completed. Many American myths attempt to account for the beginning, or at least the early stages, of this process; but these tales of the Wintu and Yana describe only the last stages. They are tales of metamorphosis; they speak of things already in existence, which are merely changed in form. It might be more proper to say they treat of completed evolution, for many of the creatures, before their final transformation, approximated the forms and characters which they now exhibit. The American myth-makers an-

ticipated the philosophy of Darwin. Again, some of the tales contain little or nothing even of metamorphosis, as, for instance, the story of Norwan which the author justly compares with that of Helen of Troy. The words "Primitive America," too, may lead many to expect a wider field of investigation than that of northern California.

Some of the accounts of metamorphosis are highly ingenious and have mythic reasons readily understood; but we cannot discern why the Yana should have selected the soft and brittle California buckeye as the material which Jupka transformed into their ancestors.

We miss some elements which are very prominent in other Indian myths. We find no ceremonial circuit, no certain evidence of a sacred number (although five and its multiples are most frequently found), and no symbolism of color. On the other hand we meet elements, too numerous to mention, with which we are familiar in the myths of other tribes. Our old friend Coyote frequently appears, usually in the character of a mischievous trickster who often comes to grief in the toils he has set for others. The author wisely gives us numerous particulars, apparently meaningless and foolish, which the less skilled or less conscientious collector might think unworthy of record. We may be sure that all these particulars have significance—they are not mere padding; they have reference to ceremonial work, to tribal custom or to natural phenomena which, if not explained today, may be tomorrow.

In the introduction, which is an elaborate essay on Indian myths in general, some conclusions are reached which are sustained by the legends of the Wintu and Yana; but not by those of other Indians.

WASHINGTON MATTHEWS.

The Magic of the Horse-shoe, with Other Folk-Lore Notes. By ROBERT MEANS LAWRENCE, M.D. Boston and New York: Houghton, Mifflin, & Co., 1898. 8°, iv, 344 pp.

The last essay in this book is entitled "The Luck of Odd Numbers"; it contains a section on the number seven and closes with this sentence: "Therefore it is doubtless true—and the truth should make us free—that the greater our indifference to the various alleged omens and auguries which so easily beset us, the more readily shall we acquire and retain a firm and enduring dependence on Divine Providence." Notwithstanding this wise conclusion, the author gives us just seven essays in all. "The Magic of the Horse-shoe," the largest and most important paper, occupies 139 pages. The other articles are: "Fortune and Luck," "The Folk-Lore of Common Salt," "The Omens of Sneezing," "Days of Good and Evil Omen," and "Superstitious Dealing with Animals."

The author somewhat disarms criticism by saying in his preface: "The expert folk-lorist may find much to criticise; but this book, treating of popular beliefs, is intended for popular reading." For all this modest declaration, we believe the expert will read the work with interest and profit, even if he finds in it little that is new to him or remembers illustrations which the author may have overlooked. We have noted some errors, but they are neither numerous nor important.

The following, coming from the pen of a physician, causes some surprise: "Moreover, saltness has been thought to be an essential attribute of tears" (p. 169). If it is not *known* to be such, our text-books on physiology have long deceived us. Is the author one "who never ate his bread with tears," or never otherwise tasted the lachrymal secretion? It would seem that the savages of California recognize the saltness of tears. In Mr Curtin's *Creation Myths of Primitive America*, reviewed in this number, we find a Californian tale (p. 419), of one who wept a rivulet of tears, and at the place where he wept there is now a salt spring.

The author, following Eugene Schuyler's *Turkistan*, tells us: "When, also, any one hiccoughs, it is etiquette to say, 'You stole something from me,' and this phrase at such times is supposed to produce good luck" (p. 218). The reviewer conjectures that this may not be so much for courtesy as for cure. He remembers that in his childhood an old rural dame once relieved him of hiccough by accusing him of theft, After some moments of angry and indignant denial on his part and reiterated accusal on hers, she smiled and asked, "Where is your hiccough?" "It is gone," was the reply. "Yes, and I scared it off; I have often cured hiccough in that way," she said. He thought the cure was worse than the disease.

The work is well printed, tastefully bound, and presented, altogether, in the excellent style of the Riverside Press.

WASHINGTON MATTHEWS.

The Cross in Tradition, History, and Art. By the Rev. WILLIAM WOOD SEYMOUR. New York and London: G. P. Putnam's Sons, 1898. Roy. 8°, xxx, 489 pp., ills.

This sumptuous book is primarily ecclesiastic and devotional, and hence hardly to be considered or criticized from the standpoint of the scientist; so that occasional lapses, such, for example, as the introduction of an illustration from Squier, without reference to this well-known author either in the bibliography or in the index, may be passed over lightly. The keynote to the work is struck in the opening paragraph, which is a quotation from St Augustine; and this tone is

maintained throughout. One of the values of the book to anthropologists is found in numerous and often excellent illustrations of the cruciform and related symbols characteristic of the earlier culture stages, the cuts numbering 266. The work begins with a ten-page bibliography; the body is divided arbitrarily into three parts, and these again into thirty-nine chapters; it ends with a satisfactory index. Among the chapter-subjects may be noted "The Cross before the Christian Era and in Prehistoric Times," "Types of the Cross," "The Early Form and Use of the Cross," "Legends of the Cross," "The Cross in Early Christian Art," "Cruciform Ornaments," "Landmark Crosses," "The Cross in Heraldry," "Superstitions Concerning the Cross," and "The Sign of the Cross." The authorial part of the work was crippled by the death of the author shortly after the completion of the first draft of the manuscript, and again by the death of his literary executor (Rev. Thomas S. Drowne) before the proof-reading was finished; yet there are full lists of contents and illustrations, besides the bibliography and fifteen-page index. In this and other respects the publishers have done their part admirably; the book is handsomely printed in large type, with broad margins and inset side headings, and is thus comfortable for reading and convenient for reference.

W J McGee.

How Music Developed. A Critical and Explanatory Account of the Growth of Modern Music. By W. J. Henderson. New York: Frederick A. Stokes Company. [1898.] 12°, viii, 413 pp.

This is a valuable contribution to the evolution of music, but it deals only with the evolution of modern music. The work assembles a large body of facts in convenient form for the ethnologist who pursues this subject. Not having studied music as it exists in tribal society, and hence having no adequate conception of primitive music, statements are made which to the ethnologist seem a little bizarre; thus, the author speaks of three stages of music, in which melody is developed first, then harmony, and finally rhythm, and he ignores that stage which the ethnologist knows as symphony, the last to be developed and especially characteristic of modern music. This he does by considering the elements of symphony as if they were elaborations of harmony. In all primitive music rhythm is rhythm of accent or stress: (1) It is rhythm of loud and soft; (2) it is rhythm of high and low; (3) it is rhythm of long and short; and (4) in symphony it is rhythm of theme, or perhaps it would be better understood if called rhythm of musical motive.

Our author well explains the development of theme accomplished by Wagner, though he seems to question the development of rhythm which Wagner accomplished; nor does he seem to understand fully the development of melody by the use of unwonted intervals, especially in the recitative. We may refer this last peculiarity of Wagner to his association with Helmholtz and especially with Engel. It is this introduction of unwonted intervals for which he is most bitterly criticized. It is affirmed by many that he violates melodic and harmonic rules and that hence much of his music is not music at all. But when the ear becomes accustomed to the new intervals, they are found to be exceedingly pleasing, and the passages which are condemned are at last considered to be the most delicate in musical expression. To the common ear, Arabic or Chinese is not music at all, but only noise; when at last the delicate intervals are appreciated, they are found to be very sweet. But all sweetness cloys, and the bolder intervals of Aryan music may still be defined as better expressing strong emotion, although the finer intervals of some peoples may well be introduced into Aryan music as Wagner has done. J. W. POWELL.

Biologia Centrali-Americana. Archæology. By A. P. MAUDSLAY. Part 10. London, January, 1899. 4°, Text, pp. 31–38; plates 74–93.

In Mr Maudslay's publication of the results of his explorations in the field of ancient Maya culture, Central American archeology has received its greatest contribution since the time of Kingsborough. Part 10 of this great work has just appeared, and completes the Palenque studies begun in Part 6 and continued in Parts 7 and 9. In this final Palenque part the description of the Temple of the Cross is concluded, and the Temples of the Sun and the Foliated Cross are also considered. The photogravure illustrations are of the highest character, while Miss Hunter's careful drawings, from casts and photographs, of the human figures laden with elaborate decorations, of the intricate symbolism, and of the hieroglyphic inscriptions, give us at last accurate material for study. Archeologists are now able to make exhaustive comparisons of the Palenque sculptures with those of Copan already published by Maudslay in the first four parts of his work.

The plates devoted to the initial series of glyphs (first recognized as such by Maudslay) and the two-headed dragon and water plant are highly suggestive, and the symbolism brought out in the latter could be thus seen only in the drawings; study of photographs alone would fail to reveal these forms. In the text Mr Maudslay has given the values of the initial series as worked out by the aid of Mr Goodman's

tables, published as an appendix to the work, which has appeared as Part 9. These values are as follows :

	Temple of the Foliated Cross	*Temple of the Sun*	*Temple of the Cross*	*Inscribed Steps*	*Temple of the Inscriptions*
Great Cycle.....	54	54	53	55	54
Cycle	1	1	12	3	9
Katun	18	18	19	18	4
Ahau	5	5	13	12	20 or 0
Chuen	4	3	4	15	18 or 0
Day	20 or 0	6	20 or 0	12	20 or 0
Named Day.	1 Ahau	13 Cimi	8 Ahau	8 Eb	13 Ahau
Named Month....	13 Mac	19 Ceh	13 Mac	18 Tzec	18 Yax

This will suffice to show the great advance made in our knowledge of the contents of the graven hieroglyphic inscriptions since the appearance of the first number of Maudslay's monumental publication. It is exceedingly doubtful if we shall ever know much more about Palenque than what is now published. The present writer spent a number of weeks in Palenque in the winter of 1897–98 with the object of carrying on extensive excavations, but was deterred by the dense vegetation and the almost incessant rains which prevail during nearly ten months of the year. Laborers are scarce, and it is now almost impossible to procure them on account of the coffee plantations in the Tumbala region where all the laboring Indians near Palenque are employed. It is gratifying to know that the Mexican government has decided to remove all of the important tablets to the Museo Nacional in the City of Mexico. It is to be hoped that the parts of Mr Maudslay's work relating to Quirigua, Menche or Yachilan, Tikal, and other Maya ruins will be published as speedily as possible.

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NOTES AND NEWS

Philipp Johann Joseph Valentini, Ph.D., whose death occurred March 16, 1899, at Saint Luke's Hospital, New York City, was born in Berlin in 1824. His father was an Italian, and his mother a German. The father was a teacher of foreign languages, and the author of a German-Italian dictionary, which, at the time, was highly estimated for its accuracy. He was also tutor of the young scions of royalty at His Majesty's court.

The son Philipp was educated in the Lyceum of Rosleben and in the Gymnasium of Torgau. Later he studied jurisprudence at the University of Berlin, where he was appointed auscultator of the Supreme Court. In 1854 he went to Central America, and settled on the site of Puerto Limon, on the Atlantic shore of Costa Rica, where he founded the above town under government auspices. Learning that the Costa Ricans could give no account of their ancestors, he returned to Germany in 1858 to search for manuscripts and historical information regarding the colonization of this part of Central America by the Spaniards. The results of this study were embodied in a dissertation for which he received the degree of Ph.D. from the University of Jena. His early studies were influenced somewhat by his acquaintanceship with the great Humboldt, who was an intimate friend of his father.

In 1861 Valentini returned to Costa Rica, where he lived for eleven years, meanwhile establishing a coffee plantation. While living in Costa Rica, he made several trips along the coast, from the Isthmus of Panama as far north as Boca del Toro. Later he made a trip through Nicaragua and San Salvador into Guatemala, and there came into communication with the lamented Berendt. In Guatemala City he made researches among the manuscripts preserved in the Institute, and among other things discovered a portrait of the famous conquistador, Bernal Diaz del Castillo, which he published in the *Historical Magazine*, New York. At this time he completed his manuscript on the discovery and conquest of the ancient province of Castilla de Oro, the publication of which at the time was prevented by a revolution in Costa Rica; and this still remains among his unpublished works. His researches carried him as far as the famous Quiche ruins of Santa Cruz del Quiche.

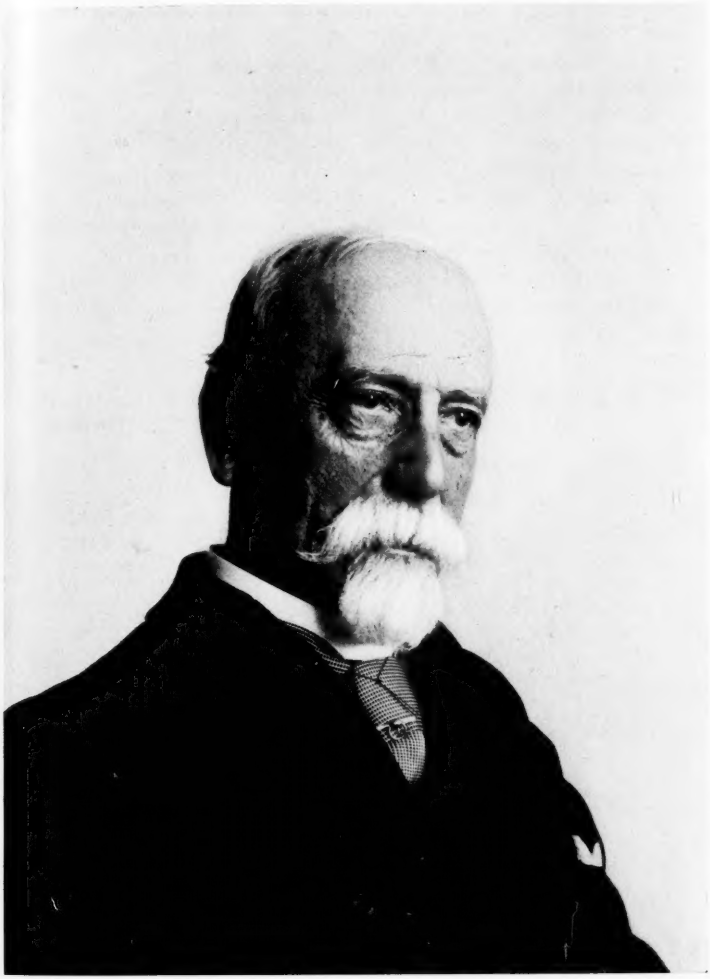
He went to New York City in 1871, and we find him in 1879 engaged as an instructor of languages in the preparatory classes of the

School of Mines of Columbia University. About that time he began to publish monographs on the archeology of Mexico and Central America—the result of his devotion to these matters while in Central America. He began to expand his matured views and rich experiences in a series of remarkable works, which, though limited in extent, were welcomed by men of science. He had a good knowledge of the Maya language and less so of the Nahuatl. Both greatly aided him in his studies, although linguistics served to him only as a means of attaining scientific ends in other directions. His mental training was logical, thorough, and fundamental, and reflected the critical spirit which we find throughout in the higher institutions of learning in Germany. He stated his views frankly and fearlessly, as he thoroughly hated all ambiguity in life, in style, and in science. So were also his literary productious clear, painstaking, and to the point.

The Toltec nation which plays so important a part in the Spanish histories of old Anahuac, was a misconception, he declared ; for the history of this people was partly mythical, partly a series of exaggerations, which sprang from the magnifying of rather insignificant facts. To make, as these Spanish writers do, a Mexican empire of the Toltec power, which is said to have preceded the " empire " of the Chichimecs, was just as unhistoric as to say that the governor of the present State of New York is the ruler, king, or emperor of the United States of America.

Quite a number of his monographs were published in the *Proceedings* of the American Antiquarian Society of Worcester, some being translated from German originals by Stephen Salisbury, Jr. The first noteworthy work on the archeology of Mexico was his study of the famous Calendar Stone, which was first delivered in German in the form of a lecture in New York City in 1878. An abstract was translated by Mr Salisbury and published by the Antiquarian Society. The original work is far more extensive, and remains among Valentini's unpublished writings. Of great importance was his argument against the calculiform Maya alphabet contained in Bishop Landa's writings, " The Landa Alphabet, a Spanish Fabrication," 1880. He demonstrated beyond all cavil that the Mayas never had any alphabet in our sense of the word, representing the isolated sounds of the language phonetically, but that Landa's characters form only portions of ideographic symbols.

Although the Maya calculiform script is still far from being solved, Valentini is to be considered as a pathfinder in this line of reseach for having dissipated many of the illusions and false theories bearing on



PHILIPP JOHANN JOSEPH VALENTINI

this relic of semicivilized antiquity. He was greatly interested in the history of the earliest discoveries of the Spanish and Portuguese explorers and navigators in America. His most extensive paper, " The Portuguese in the Track of Columbus," illustrated by many maps, was published in the *Bulletin* of the American Geographical Society, New York. His remarks on the travels of Pinzon, who first saw the mouth of Amazon river, were recorded and reviewed in the *American Antiquarian* of Chicago. One of his last publications belonged to this class, and is entitled " Pinzon-Solis, 1508," published in the *Zeitschrift der Gesellschaft für Erdkunde*, Berlin, 1898. His last work, now being published in the *Journal of American Folk-Lore*, is on the Trique Indians of the state of Oaxaca, which he read at the meeting of the Folk-Lore Society in Columbia University in December last.

The following list of Valentini's writings, from the *Proceedings* of the American Antiquarian Society, was prepared by Mr Salisbury, to whose sketch of Valentini's life, published as a note to the paper on the Mexican Calendar Stone, we are indebted for many of the facts presented in this brief notice :

A New and an Old Map of Yucatan, 1879.

Mexican Copper Tools. Illustrated. (*Proceedings* of American Antiquarian Society, 1879.)

The Katunes of Maya History. Illustrated. (*Ibid.*, 1879.)

Mexican Paper. Illustrated. (*Ibid.*, 1881.)

Two Mexican Chalchihuites, the Humboldt Celt and the Leyden Plate. Illustrated. (*Ibid.*, 1881.)

The Olmecas and the Tultecas. Plates and map. (*Ibid.*, 1883.)

Semi-lunar and Crescent-shaped Tools, with special reference to those of Mexico. Illustrated. (*Ibid.*, 1885.)

The Landfall of Columbus at San Salvador. Plate. (*Ibid.*, 1892.)

Analysis of the Pictorial Text Inscribed on Two Palenque Tablets, Parts I and II. Plates. (*Ibid.*, 1895, 1896.)

Das Geschichtliche in den mythischen Städten " Tulan," 1895.

Clay Figures Found in Guatemala, 1895.

Dr Valentini left a great number of manuscripts and notes, several of which are practically ready for publication. His most important contribution was an historical work on Costa Rica, bearing the title *Castilla de Oro*. This treats of the early history of Costa Rica, and it is hoped that it will eventually be published by the Costa Rica government. During the last three years he was engaged in making exhaustive studies of the migrations of the early Mexican people, finding analogies with their culture in Persia and Tibet. He was engaged also in a study of the origin of the astrological calendar, and claimed to have found its counterpart in Tibet. His knowledge of early

Spanish-American history was very extensive. In Dr Valentini's death American archeology has lost one of its most devoted and painstaking students. A. S. GATSCHET.

The Voth Collection—Through the generosity of Mr Stanley McCormick, of Chicago, the Field Columbian Museum has been enabled to purchase the ethnological collection formed by Rev. H. R. Voth, the missionary to the Hopi or Moki Indians of northeastern Arizona. This collection was gathered by Mr Voth for the purpose of aiding him in his studies of and work among these people since 1893. Mr Voth's knowledge of the Hopi language and the studies he has made of these people, not only as a missionary but also as an ethnologist, enable him to furnish with the collection such information as will make it particularly valuable for the study of the Hopi Indians in general, and especially those of the pueblo of Oraibi. The collection will prove so much the more valuable as Mr McCormick has provided also the means for employing Mr Voth a number of months, during which time he will assist in preparing the labels for and in augmenting the collection by reproducing various altars, sand mosaics, etc. Mr Voth's collection has been known to scientists interested in the Hopi for some time, and several efforts have been made to purchase all or parts of it, but the collector has hitherto refused to consider any offer in that direction. His health, however, making an extended leave of absence necessary, Mr Voth saw the necessity of having the collection deposited in a place of greater security than was possible in his home at Oraibi; he therefore finally consented to dispose of it. The collection is now being installed in the Field Columbian Museum. Perhaps the first in general interest among the groups of objects is a collection of two hundred *tihus*, or dolls, representing the Hopi *katcinas* so far as they are known, especially those of Oraibi. In his studies of the complex question of the Hopi *katcinas*, Mr Voth soon discovered that many of the common *tihus* made by the Hopi are manufactured with little regard for accuracy, at least so far as the details of symbolism are concerned; hence many of the *tihus* were made to order in accordance with the true symbolic details of the personages which they are designed to represent. They are thus more accurate miniature reproductions of the *katcinas* than are those generally manufactured by the Hopi for sale. Secondly may be mentioned several dozen pipes of both stone and clay, including a number that have been used only in ceremonies (some of them for a long time), some used for ordinary social smoking in the kivas, and also a few found in house ruins near Oraibi. Of religious paraphernalia the collection contains a great variety, including

katcina kilts and sashes, Snake-dance costumes, bridal and ceremonial robes, sacred water vessels, the different paints used, etc. Of unusual interest, also, are several dozen masks, some of which are quite ancient, and which, in connection with the Hopi masks obtained by the museum on a previous occasion, make this the largest and most valuable collection of Hopi masks thus far obtained. Of ancient pottery the collection contains nearly five hundred pieces, including the corrugated varieties known as gray and black, as well as yellow, red, and plain ware, and also a few small selected specimens of modern pottery. The collection of objects of stone is of particular interest, as it comprises, in addition to axes, hammers, smoothing stones, corn grinders, etc., several dozen fetishes and idols, in both human and animal form, which have been in use by the Hopi for a long time, and such as are still used today. There are also two mask-forms, over which the bodies of the masks were stretched when they were made of rawhide. Mr Voth has also made a beginning in the collection of different kinds of prayer-sticks (*pahos*), of which he finds a greater variety to exist than is commonly supposed. While the collection of these objects is not complete, it is the best that has thus far been obtained. As Mr Voth has had in view a collection that would illustrate the Hopi in all phases of life, his objective material contains, besides the articles specially mentioned, many others illustrating the ethnology of these interesting people, such as ornaments of shell, stone, and other material; rattles, spoons, drills, and various other implements of horn and bone; bows, arrows, feather-cases, and other implements and utensils of wood; articles of clothing of different fabrics; trays, gourds, baskets, rattles, and other objects of vegetal material. The collection as a whole offers unusually valuable data for the study of the Hopi people, especially as the descriptions given by Mr Voth are based on intimate acquaintance with the language, customs, and religion of these people. The Hopi collection promises to aid very materially in further studies of and researches among these most primitive people of our country.

GEORGE A. DORSEY.

A Difference of Opinion—In his résumé of Prof. Ferdinand Blumentritt's studies of the Philippines, which appears in the January number of this journal, Dr Brinton says that "it will interest readers to learn that the Professor is positive that the Filipinos are sufficiently advanced to be capable of independent self-government, and it is his ardent wish that this shall be the outcome of our wresting them from Spanish misrule." *Au contraire*, Prof. Dean C. Worcester, one of the present Philippine Commission and author of *The Philippine*

Islands and their People, a record of his personal observation and experience during nearly or quite three years in the archipelago, is of the opinion that the civilized natives are utterly unfit for self-government, and that "their morals improve as the square of the distance from churches and other so called civilizing influences." G. R. S.

Zoque and Mije—The Mexican state of Oajaca is equal in size to about half the area of Pennsylvania, and is mountainous throughout. Within its limits reside a large number of civilized Indian tribes who speak many different languages belonging to several linguistic stocks. The most populous native group is the Zapotec, and next in order of number is the Mixtec, both belonging to the Zapotecan family. Other tribes are the Zoque and the cognate Mije or Mixe, whose territory extends into the adjoining states of Chiapas and Tabasco. The main Mije settlement in Oajaca is at San Juan de Guichicovi, where they have resided since very early times. The two villages called Chimalapa form the center of the Zoque population.

The dialects of the cognate Zoque and Mije were early studied by the padres, who introduced Christianity among them more than two centuries ago, the earliest Zoque grammar dating from 1672. The ancient *artes* and *vocabularios* contain a large number of terms, but the information which they render on the grammatic structure of the languages is limited. Still, we may gather from them that the noun undergoes little inflection, but that the whole predicative and inflective power is vested in the verb. The cases in English are supplanted in Zoque and Mije by postpositions; that is, prepositions placed after the nouns. Relative pronouns do not exist, but in their stead there is a relative particle, the place of which follows that of the verb. Raoul de la Grasserie, who has brought together all the existing material on the two dialects, shows that in the verbal inflection Mije places the subject pronoun before the verb, Zoque after it.[1] The root is monosyllabic in both; there is no objective conjugation with incorporative forms, but polysynthesis by particles inserted in the verb is rather predominant. The personal pronoun of Zoque closely resembles the possessive, but is not identical with it. The substantive verb *potz* enters largely into the inflection of the verb and there figures as a suffix. The numeral system is quinary, and in Mije all simple numerals from one to ten appear to be dissyllabic. Generally speaking, Zoque is more archaic than Mije, for it has preserved its words in fuller form. A. S. GATSCHET.

[1] *Langue Zoque et Langue Mixe. Grammaire, Dictionnaire, Textes Traduits et Analysés, par R. de la Grasserie.* Paris: Maisonneuve, 1898. 8°, 384 pp. Tome XXII of the *Bibliothèque Linguistique Américaine.*

"The Growth of Toronto Children" is the title of a contribution of 60 pages, by Dr Franz Boas, to the recently published *Report of the Commissioner of Education* for 1896-7. It contains the results of various measurements of Toronto school children of both sexes, compared with those obtained in the schools of Oakland, California. When, in 1891, active preparations for the World's Columbian Exposition began, Prof. F. W. Putnam, director of its Department of Anthropology, placed Dr Boas in charge of the section of physical anthropology, and a plan was devised for representing as fully as possible the growth and development of American children. The article referred to is one of the results of this praiseworthy undertaking. A. S. GATSCHET.

New York Academy—The regular monthly meeting of the Section of Anthropology and Psychology of the New York Academy of Sciences was held Friday evening, February 24th. Two papers were presented by the anthropologists, one by Mr F. C. Spencer on the "Origin and Persistent Influence of Sacred Number Concepts"; the other by Dr Franz Boas on "Anthropometric Charts." Dr Boas gave an account of some of his recent investigations which seem to indicate that the anthropometric charts now used in the gymnasium and in anthropology are nearly worthless as a means of comparing the development of individuals. At the meeting of the subsection of Philology, Mr J. Dyneley Prince presented some notes on "Passamaquoddy Literature," and Mr J. C. Egbert Jr a paper on "Wax Writing Tablets of Pompeii." C. B. BLISS.

Deaths—Dr CAMILLE DARESTE DE LA CHAVANNE, professor at the École d'Anthropologie de Paris, and former president of the Société d'Anthropologie.

Rev. WILLIAM COLENSO, of New Zealand, distinguished for his studies of Maori antiquities and mythology.

Père JEAN-ANDRÉ CUOQ, of Oka, Canada, aged 78 years; a leading authority on the Nipissing and Mohawk languages, and the author of numerous works in or pertaining thereto.

At New York City, March 16, PHILIPP JOHANN JOSEPH VALENTINI, an authority on Central American and Mexican history and certain phases of archeology. An extended notice appears elsewhere in this number.

At New Haven, Connecticut, March 18, Prof. OTHNIEL CHARLES MARSH, Ph.D., LL.D., of Yale University, aged 68 years; former president of the National Academy of Sciences and of the American Association for the Advancement of Science; noted generally for his work in vertebrate paleontology, but among anthropologists was known as the

possessor of an unusually fine collection of Chiriqui pottery and gold ornaments, and as the author of several papers on anthropologic subjects, including a vigorous "Statement of Affairs at Red Cloud Agency Made to the President of the United States" in 1875.

The Salishan Indians form the most important family of aborigines in Washington and British Columbia, and indeed their settlements extend even beyond the boundaries of those sections on the north and east. On the Pacific coast the southernmost representatives of the Salishan stock are the Tillamook Indians of Oregon, who, though not a populous tribe, are of great interest to the ethnologist. Tillamook is a Chinook name, signifying "the people of Nekelim," which latter name in the Cathlamet dialect signifies "the place Kelim." The labial sounds were almost entirely lost from their phonetics and their cultural development was visibly influenced by the tribes of northern California. In the summer of 1890 Dr Franz Boas visited the Oregon coast and was enabled to gather a number of interesting myths, legends, and traditions, thirteen of which have recently appeared in the *Journal of American Folk-lore* (1898) under the caption "Traditions of the Tillamook Indians." The titles of some of the stories are: "The Thunderbird"; "Journey Across the Ocean"; "The Six Travelers"; "The Panthers and the Wolves"; "The Ascent to Heaven"; and "Asáyahal, the Warrior." A. S. GATSCHET.

International Geographical Congress—In pursuance of a resolution adopted at the meeting of the International Geographical Congress, held at London in 1895, the seventh meeting of the Congress will be held at Berlin from September 28th to October 4th, 1899. The scope of the subjects to be discussed at the meeting is broad, including anthropogeography (industrial, commercial, and political geography) and ethnology, in addition to the general range of geographical science. Dr Karl von den Steinen, whose ethnologic researches in Brazil are so well known, extends a cordial invitation to all American ethnologists to attend the meeting, or at least to transmit papers for presentation. Manuscripts should be submitted not later than June 1st to The General Secretary, Prof George Kollm, 90 Zimmerstrasse, S. W., Berlin.

Pittier de Fábrega—In the January number of this journal, Dr Brinton, in reviewing the recently published work on *Die Sprache der Bribri-Indianer* by Dr H. Pittier de Fábrega and the late Friedrich Müller, expressed the hope that "Professor Pittier will be incited to still further researches in this productive field"—a hope that has doubtless been echoed by every student of American linguistics familiar with Pittier's valuable work. It is therefore to be deplored that on

January 7th, without warning, Sr Perez Zeledon, the Minister of Public Instruction, under pretext of economy, closed the Instituto Fisico-Geográfico at San José, of which Professor Pittier was director, and summarily dismissed its entire staff. As this institute was practically the only means afforded by the Costa Rica republic for the dissemination of knowledge regarding its wealth of archeology, ethnology, and linguistics, the wisdom of the minister's action is difficult of appreciation by students who have watched with interest the excellent results of Professor Pittier de Fábrega's directorship.

Brintoniana—Yielding to the suggestion of the late James C. Pilling, whose bibliographies of North American languages are so well and favorably known, Dr Daniel G. Brinton has recently published, for private distribution, "A Record of Study in Aboriginal American Languages" (Media, 1898, 8°, 24 pp). Even one not already familiar with the work of Dr Brinton along this line during the last forty years cannot fail to be impressed with the enormous amount of energy which he has expended in behalf of American linguistics, and with the high value of the results achieved. This personal linguistic bibliography, which aggregates 71 titles, comprises: I, General articles and works (15 titles); II, North American languages north of Mexico (14 titles); III, Mexican and Central American languages (32 titles); and IV, South American and Antillean languages (10 titles). It is hoped that Dr Brinton's next step in this direction will be a complete record of his non-linguistic studies.

British Association—At the Bristol meeting of the British Association for the Advancement of Science, a resolution was submitted to the council of the association, requesting further action with regard to the establishment of a Bureau of Ethnology for the United Kingdom, by renewing correspondence with the trustees of the British Museum. The council was also recommended to issue the collected reports on the northwestern tribes of Canada in a single volume, at a moderate price, reprinting as many of the reports as may be necessary. Sir William Turner, professor of anatomy in the University of Edinburgh, has recently been elected president of the Association for the Bradford meeting in 1900.

Siberian Archeology—In volume XXXII, numbers 1, 2, 3, of the *Memoirs* of the Kazan (Russia) Society of Naturalists, Dr S. Tschungunoff describes some deformed skulls found in the *kurgans* or burial mounds of Siberia. The article forms the ninth part of this authority's "Materials for the Anthropology of Siberia," the first eight contributions having appeared in parts 6, 7, and 10 of the *Proceedings* of Tomsk

University. The author describes two macrocephalic deformed skulls which were found in the Kainsk district of Tomsk, as well as three others of the same type from the Crimea.

Tolstoi Medals Awarded—The large Tolstoi medal of the Russian Academy of Sciences has been awarded to L. Besser and K. Ballod for their researches in the natality and mortality of the populations of European Russia, the Baltic provinces, and other sections of Europe, including Great Britain. The small Tolstoi medal has been presented to P. G. Matsokin for a manuscript work on the half-breeds of Transbaikalia.

Holland Anthropological Society—Through the efforts of Drs Sasse and Winckler, a Society of Anthropology has been established at Amsterdam, which has already enlisted among its members a sufficient number of active anthropologists to make the success of the new society assured. The officers are Dr C. Winckler, president; Dr Eugène Dubois, vice-president; Dr Sasse, secretary; Dr C. Kerbert, treasurer; Dr John E. Grevers, librarian.

Congrès d'Anthropologie et d'Archéologie Préhistoriques—A committee, of which M. Alexandre Bertrand is chairman, has been selected to organize the twelfth session of the Congress of Prehistoric Anthropology and Archeology to be held at Paris, commencing August 20, 1900.

Expedition to Siam—Mr W. W. Skeat of Cambridge University has departed from England with an expedition whose object is to investigate the flora, fauna, and ethnology of the southern portion of Siam lying north of the Protected States of Malay peninsula. The party will remain in the field about a year.

Sanscrit Manuscripts—Parts 8 and 9 of *A Descriptive Catalogue of Sanscrit Manuscripts in the Library of the Calcutta Sanscrit College* have made their appearance. The catalogues were prepared under orders of the Government of Bengal, by Hrishi'kes'a S'a'stri', second grammar pandit of the Sanscrit Collegiate School, and Si'iva Chandra Gui, M. A., B. L., lecturer in the same institution. They bear date 1897 and 1898 respectively.

Professor Flinders-Petrie, it is announced, has presented to the Museum of Anatomy and Anthropology at Cambridge, England, nineteen cases of skulls and bones from his excavations at Hieraconopolis. These include remains of the prehistoric and earliest dynastic races in Egypt.